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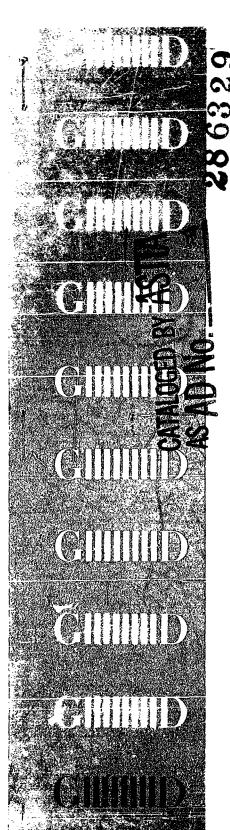


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MATERIAL - GLASS CLOTH REINFORCED PLASTICS - ROOM AND ELEVATED TEMPERATURE - PROPERTIES OF

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A DIVISION OF GENERAL DYNAMICS CORPORATION
(FORT WORTH)

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MODEL B-58

PART I
REPORT FGT-2186

DATE 1 May 1959

TITLE

MATERIAL - GLASS CLOTH REINFORCED PLASTICS - ROOM & ELEVATED TEMPERATURE - PROPERTIES OF

SUBMITTED UNDER

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MATERIAL - GLASS CLOTH REINFORCED PLASTICS -

ROOM & ELEVATED TEMPERATURE - PROPERTIES OF

PURFOSE:

The purpose of this invertigation was to establish design allowables for glass-cloth reinforced plastics with the following fabric and resin combinations:

181 cloth with Class II (Laminac 4232) resin 181 cloth with Class III (Conolon 506) resin 181 cloth with Class IV (Epon 828) resin 143 cloth with Class II (Laminac 4232) resin 143 cloth with Class III (Conolon 506) resin 143 cloth with Class IV (Epon 828) resin 120 cloth with Class II (Laminac 4232) resin 120 cloth with Class III (Conolon 506) resin 120 cloth with Class IV (Epon 828) resin 183 cloth with Class II (Laminac 4232) resin 183 cloth with Class III (Conolon 506) resin 183 cloth with Class III (Conolon 506) resin 183 cloth with Class IV (Epon 828) resin

SUMMARY:

That panels of the materials listed above were produced by the Plastics Shop (Dept. 35) and the Chemistry Laboratory of the Engineering Test Laboratories. The following data ship objects properties were obtained for each panel: I imber of plies, cure cycle, post-cure cycle, Barcol hardness, maximum and minimum thickness, resin content, dielectric content, and dissipation factor. Panels were considered acceptable for testing if they exceeded the minimum requirements of specification FMS-0031(A) with respect to Barcol hardness, dimensional tolerances, and over-all good appearance.

Various tensile properties, including Poisson's ratio, and the bearing properties were determined for the materials listed above at room temperature, 300 and 500 F, tested at three different angles to the warp direction of the material, viz., 0, 45 and 90°. In addition, the same properties at room temperature were determined for the same materials after soaking the material in boiling distilled water for three hours. Compression properties also were to be determined, but at the date of this writing, the compression tests are incomplete. Results of the compression tests will be presented at a later date in an addendum to this report.

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From each tensile specimen, the primary modulus, secondary modulus, primary proportional limit, secondary proportional limit, ultimate strength, and type of failure were determined and recorded. Bearing yield and ultimate strength and type of failure were determined for each bearing specimen. From each compression specimen, the compressive modulus and ultimate strength will be determined. In addition, two jigs and three methods of measuring compressive strain will be evaluated.

Average values obtained for Poisson's ratio were found to vary between the following limits:

Parallel to the warp direction at room temperature:

.086 for 181 cloth with Class II (4232) resin to .278 for 143 cloth with Class III (506) resin.

At 45° to the warp direction at room temperature:

.16 for 143 cloth with Class II (4232) resin to .513 for 181 cloth with Class IV (828) resin.

At 90° to the warp direction at room temperature:

.051 for 143 cloth with Class II (4232) resin to .165 for 181 cloth with Class IV (828) resin.

Parallel to the warp direction at 300 F:

.068 for 181 cloth with Class II (4232) resin to .265 for 143 cloth with Class III (506) resin.

Laminates made with 181 cloth had values for ultimate tensile strength and tensile modulus of elasticity in the warp direction which were approximately equal to these properties when tested 90° to the warp direction. These properties at 45° to the warp direction, however, were reduced by approximately 50% or more.

Laminates of 181 cloth with Class II (4232) and Class III (506) resins retained approximately 85% of their room temperature tensile properties at 500 F with the exception of laminates made with 181 cloth and Class II (4232) resin at 45° to the warp direction. Approximately 50% of the room temperature tensile properties were retained at 500 F for this condition. The room temperature ultimate tensile strength at warp directions of 0, 45, and 90° for 181 cloth with Class IV (828) resin were decreased at 500 F by 28, 44, and 23% respectively.

The ultimate tensile strength values at room temperature for laminates made with 143 cloth at 45 and 90° to the warp direction were approximately 19 and 14%, respectively, of the values parallel to the warp direction.

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Soaking the above materials at 300 F while stressed to 20 and 40% of their room temperature strengths for 100 hours had no significant effect on their properties at 300 F.

All tensile specimens made of 181 cloth with Class II (4232) resin which were cut parallel to the warp direction exceeded the minimum values of specification FMS-0031(A). Five specimens of 181 cloth with Class III (506) resin and five specimens of 181 cloth with Class IV (828) resin did not meet these requirements. No other specification or comparable data are available for checking the results obtained for the other test conditions.

Bearing yield and ultimate strength were not found to vary with the direction of warp for laminates made with 181 cloth. Laminates made with 181 cloth with Class II (4232) resin and 181 cloth with Class III (506) resin retained approximately 58 and 79%, respectively, of their room temperature bearing properties at 500 F; however, a reduction of approximately 53% in the room temperature bearing properties at 300 F for 181 cloth with Class IV (828) resin was observed.

The soaking of bearing specimens of 181 cloth with Class II (4232) or Class III (506) resins at 300 F while loaded to 20 and 40% of their room temperature bearing strength for 100 hours had no significant effect on the properties at 300 F; however, similar treatments on two specimens of 181 cloth with Class IV (828) resin caused failure before 100 hours of soak time was reached.

Eight specimens of 181 cloth with Class IV (828) resin were soaked at 260 F while stressed in bearing to 20% (3 specimens) and 40% (5 specimens) of their room temperature bearing strength. One specimen loaded to 20% and four specimens loaded to 40% failed before 100 hours of soak was reached. The three remaining specimens were tested at 300 F.

The bearing properties for specimens made with 143 cloth, decreased slightly with angle of warp. However, most of these specimens tested at 45 and 90° to the warp directions did not exhibit typical bearing failures. This can be explained by the fact that this material is unidirectional. No yield was obtained for some of these specimens because failure occurred before the bearing hole deformed to .0075". In these cases, deformation at failure was recorded.

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MATERIAL - GLASS CLOTH REINFORCED PLASTICS -

ROOM & ELEVATED TEMPERATURE - PROPERTIES OF

OBJECT:

The object of this investigation was to determine the mechanical properties at room and elevated temperatures for various glass-fabric and resin combinations of plastic laminated materials. The following combinations were tested: 120 cloth, 143 cloth, 181 cloth, and 183 cloth with Class II, Class III, and Class IV resins, as specified in FMS-9031(A), at 0, 45, and 90° to the direction of warp of the material. The properties to be determined were:

- a. Various tensile properties
- b. Bearing properties
- c. Compressive properties

DESCRIPTION OF SPECIMENS:

Sixty glass reinforced plastic panels, numbered 101 through 160 of the following glass fabric and resin combinations were fabricated by the Plastics Shop, Dept. 35, and the Chemistry Laboratory of the Engineering Test Laboratories, at Convair, Ft. Worth:

Panel	Glass	Resin as specified in FMS-0031(A)	Panel
Number	Fabric		Size
101 to 105 106 to 110 111 to 115 116 to 120 121 to 125 126 to 130 131 to 135 136 to 140 141 to 145 146 to 150	181 cloth 181 cloth 181 cloth 143 cloth 143 cloth 143 cloth 120 cloth 120 cloth 120 cloth 120 cloth	Class II (4232) Class III (506) Class IV (828) Class II (4232) Class III (506) Class IV (828) Class IV (828) Class II (4232) Class III (506) Class IV (828) Class IV (828) Class IV (828)	26" x 24" 26" x 24" 26" x 24" 24" x 22" 24" x 22" 24" x 22" 14" x 12"
151 to 155	183 cloth	Class III (506)	14" x 12"
156 to 160	183 cloth	Class IV (828)	

Of these panels, six were fabricated by the Chemistry Laboratory, as indicated in Table I. The others were fabricated by the Plastics Shop.

Of the cloths used in making the laminates, 143 was unidirectional, and the three others were bidirectional. By definition, a unidirectional cloth is one which has greatest strength when tested in one direction in relation to the fibering. A bidirectional cloth is one which has approximately equal strength in two directions.

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The laminates were made with the following:

1. Laminac 4232 modified polyester resin reinforced with 181, 143, 120, and 183 style Garan Finished glass cloths.

2. 181, 143, 120, and 183 style Volan "A" finished glass cloths, pre-impregnated with Conolon 506 phenolic resin.

3. Epon 828 epoxy resin reinforced with 161, 143, 120, and 183 style Volan "A" finished glass cloths.

The curing system for Laminac 4232 resin was ATC (benzoyl peroxide with tricresyl phosphate) and the curing system for Epon 828 resin was meta-phenylene diamine.

The materials used in fabrication of the panels were obtained from the following vendors:

American Cyanamid Company Plastics and Resins Division 30 Rockefeller Plaza New York, N. Y. Class II (4232) resin

Cadet Chemical Corporation Lockport - Olcott Road Burt 1, N. Y. ATC (benzoyl peroxide with tricresyl phosphate)

E. I. duPont de Nemours & Co., Inc. Wilmington 98, Delaware

ATC (benzoyl peroxide with tricresyl phosphate) and meta-phenylene diamine

Hess, Goldsmith & Co., Inc. 1400 Broadway, New York, N. Y.

120 cloth 183 cloth

Narmco Resins & Coatings Co. 600 Victoria Street Costa Mesa, California

120 cloth pre-impregnated with Conolon 506 143 cloth ditto above 181 cloth ditto above 183 cloth ditto above

Shell Chemical Corporation 380 Madison Ave., New York, N. Y.

Epon 828 resin

J. P. Stevens & Co., Inc. 1460 Broadway New York, N. Y. 181 cloth

Trevarno Glass Fabrics 4924 Greenville Avenue Dallas, Texas 181 cloth

United Merchants & Mfg. Inc. 1407 Broadway New York, N. Y. 181, 143, and 120 cloth

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History sheets, supplied by the Inspection Department of the Plastics Shop accompanied each panel indicating the number of plies, cure cycle, and post-cure cycle. Barcol hardness, maximum and minimum thicknesses, resin content, the dielectric constant, and dissipation factor were determined for each panel. These items together with the date each panel was received from the shop are shown in Table I. It was originally planned that control tests were to be conducted on each panel. Specimens from each panel were to be tested to insure conformance with the minimum requirements of specification FMS-0031(A). However, after approximately 40 panels were received from the shop which did not meet these requirements, it was decided by the Engineering Materials and Processes Group to use only the following criteria as a basis of accepting panels for testing: Barcol test, dimensional tolerances, and over-all good appearance.

Various tensile properties, including Poisson's ratio, and bearing properties were determined for each condition shown in Table II. Four specimens, one from each of four different panels, were tested in the conditions indicated. To retain identity, each specimen was marked with the panel number from which it was taken and the letter A, B, or C, depending on the directionality with relation to the warp. (A signified that it was parallel to the warp direction, B that it was 45° to the warp direction, and C that it was 90° to the warp direction).

PROCEDURE:

The specimens were tested using the procedures given below. All tests at elevated temperatures were conducted by heating in ovens which were designed and constructed at Convair, Fort Worth.

Tensile Tests:

All tensile specimens were machined as shown in -1 and -3 of Figure 1, with the exception of those specimens taken from panels of 143 cloth and cut parallel to the direction of warp. Because 143 cloth is unidirectional, tensile specimens whose long dimension was parallel to the warp direction were machined with larger radii as shown in -1 and -3 of Figure 2. One end of the above tensile specimens was fabricated as shown in -5 of Figure 1 (regular type specimen) and in -5 of Figure 2 (unidirectional type specimen) for tests conducted at 500 F. So that less load to failure would be required, these specimens were machined .250" wide. Both of the above changes were made for 500 F tests to prevent bearing failures at the clevis.

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Tests were conducted on 5000 and 60,000 lb. capacity Baldwin universal test machines equipped with MA-1 microformer recorders. The specimens were loaded at a constant rate so that failure occurred in approximately 2 to 3 minutes. Load versus strain curves were recorded autographically using various Baldwin microformer type extensometers with a 2-inch gage length.

Specimens tested at room temperature and 300 F were gripped with Templin grips. Strain measurements for tests conducted at 300 F were obtained by placing the extensometer inside the oven. Tests at 500 F were conducted using a Baldwin type PSH-8MS extensometer. To allow passage of the extension arms of this extensometer through the oven walls, a clevis fitting with a loading pin was used to load the bottom end of the specimen.

In order to determine the effect of exposure for 100 hours at 300 F under sustained tensile stress on the tensile properties at 300 F, specimens were loaded in Riehle creep-rupture machines. The loading was at 20 and 40% of the average tensile strength at room temperature. After so loading for 100 hours, each specimen was removed and tested in tension at 300 F.

Poisson's Ratio:

Determinations of Poisson's ratio at room temperature and 300 F were made on tensile-test specimens, and were obtained simultaneously with the tensile-test data. Longitudinal strain was determined with extensometers, and transverse strain was obtained using type ABF-11, SR-4 strain gages mounted at the center of the specimen in the transverse direction. Strain gage readings were taken under loading at 50 lb. intervals up to approximately 500 lbs. These data were then plotted to show the relationship of load versus transverse strain. The slope of the first straight portion of the load versus longitudinal strain curve and the slope of the load versus transverse strain curve were used to calculate Poisson's ratio as follows:

$$m (1) = \underbrace{L}_{E(1)} \qquad m (t) = \underbrace{L}_{E(t)}$$

$$P. R. = \underbrace{m (1)}_{m(t)} = \underbrace{L}_{E(1)} = \underbrace{E(t)}_{E(1)}$$

m (1) - slope of first straight portion of the load vs. longitudinal strain curve.

m (t) - slope of load vs. transverse strain curve.

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E (1) - longitudinal strain (in/in).
E (t) - transverse strain (in/in)
L - load (lbs.)
P. R. - Poisson's ratio

Bearing Tests:

All the specimens used for bearing tests were machined according to the drawing shown for -7 of Figure 1. The tests were conducted on 5000 and 60,000 lb. capacity Baldwin universal test machines using the fixture shown in Figure 3. Bearing-load versus holedeformation curves were recorded autographically. The same procedure as stated above for the tensile tests was used to determine the effect of 100 hours exposure at 300 F. under sustained bearing stress on the bearing properties at 300 F. An exception to this procedure was used for specimens taken from panels fabricated from 181 cloth with Class IV (828) resin. Because two of these specimens failed during the 100 hours soak at 300 F. while loaded to 20% of the average room temperature bearing strength, the soak temperature was changed to 260 F. for this material.

Ultimate bearing strength, bearing yield strength, and the type of failure were determined for each bearing specimen tested. Bearing yield strength is that stress at which the bearing hole was deformed 4% of its original diameter. This was obtained from the load-deformation curves by extending a vertical line crossing the abscissa at .0075" until it intersected the curve. For some specimens, particularly 143 cloth with Class III (506) resin, failure occurred before this point was reached so the hole deformation at failure was recorded. All specimens were loaded at a constant rate so that failure occurred in approximately 2 to 3 minutes.

Compression Tests:

Since some of the compression tests have not been completed, particularly the sustained load tests, the pertinent data will be reported in an addendum to this report at a later date.

RESULTS:

The properties determined in the tensile tests for the laminates in the various conditions are given in Tables III through X. Also, the values for the tensile strengths and moduli of elasticity are shown graphically in Figures 4 through 10. Typical stress-strain curves are shown in Figures 11 through 27. Figures 28-1 and 28-2 are photographs of representative tensile failures.

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The results of the bearing tests are given in Tables XI through XVIII, and the values are shown graphically in Figures 29 through 34. Typical stress-deformation curves are shown in Figures 35 through 49. Figures 50 and 51 are photographs of typical bearing failures.

Compression results are not complete and will be reported in an addendum to this report as soon as possible.

DISCUSSION:

Poisson's Ratio - The average values for Poisson's ratio determined at room temperature varied considerably with the direction of warp for each material investigated. Average values ranged from .086 for 181 cloth with Class II (4232) resin to .278 for 143 cloth with Class III (506) resin when measured parallel to the warp direction. They ranged from .16 for 143 cloth with Class II (4232) resin to .513 for 181 cloth with Class IV (828) resin when measured at 45° to the warp direction. The variation was from .051 for 143 cloth with Class II (4232) resin to .165 for 181 cloth with Class IV (828) resin at 90° to the warp direction. Average values of .068 for 181 cloth with Class II (4232) resin represented the minimum and maximum average values obtained at 300 F, as measured parallel to the warp direction.

The manufacturer of the strain gages used in the determinations of Poisson's ratio indicated through correspondence that these gages had an accuracy of plus 3 to 4% when used in the transverse direction.

Tension Properties - Primary modulus, secondary modulus, primary proportional limit, secondary proportional limit, type of failure, and ultimate strength for each tensile specimen are recorded in Tables III through X. These results are shown in bar graph form in Figures 4 through 10. Typical stress-strain curves are shown for each condition in Figures 11 through 27. Figures 28-1 and 28-2 are photographs showing typical tensile failures designated D, T, S and U. Specimens which failed by separation of bonds between layers of cloth were designated D (delamination type failures). In these cases the bonds were broken. Whether delamination occurred before actual tension failure is not known. A break in which the specimen failed primarily in the fibers of the cloth was designated U (unidirectional). Two other types of failures which could not be attributed primarily to a break in the bond between cloths or to a fibrous failure of the cloth were designated T (tension) and S (shear).

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Average values are included in the Tables and plotted on the bar graphs for secondary modulus as well as primary modulus. Some tensile specimens, however, exhibited no secondary modulus. Because the stress-strain curves for specimens whose long dimension was 45° to the warp direction did not contain a clearly defined straight portion, determinations for the correct modulus were difficult and led to much scatter in the data for this condition.

The primary proportional limit was taken as the upper limit of the first straight portion (primary modulus) of the stress-strain curve, and the secondary proportional limit was taken as the upper limit of the second straight portion (secondary modulus) of the stress-strain curve. Some specimens, particularly those parallel to the warp direction, gave stress-strain curves consisting of one straight line (primary modulus). For such specimens the ultimate strength was recorded as the primary proportional limit. Other specimens had stress-strain curves which did not depart from the secondary modulus line at higher stress levels. In these cases, the ultimate strength was recorded as the secondary proportional limit.

Values recorded for primary proportional limit and secondary proportional limit tend to be deceiving. If a particular specimen has no secondary modulus (e.g., 101-C-5 of Table III), its primary proportional limit may be a value which is many times larger than that of another specimen tested (e.g., 103-C-4 of Table III), which has a secondary modulus. It is for this reason that average values for primary proportional limit and secondary proportional limit are not included in the Tables.

For laminates made with 181 cloth (see Figures 4, 5 and 6), the average values for tensile ultimate strength and modulus as measured parallel to the warp direction were approximately equal to those properties when measured 90° to the warp direction. The average values for these properties as measured 45° to the warp direction were approximately half of the parallel and 90° values or less. Average tensile ultimate strength and modulus values of specimens made with 181 cloth with Class II (4232) resin and 181 cloth with Class III (506) resin and tested at 500 F show that these materials retained approximately 75% or more of their room temperature properties at 500 F. The properties of 181 cloth with Class IV (828) resin dropped 30% or more at 300 F and substantially more at 500 F. No significant effect on the tensile properties of these materials at 300 F was observed due to loading specimens to 20 and 40% of their room temperature tensile strength while soaking them at 300 F for 100 hours. Two-inch gage marks were made on several of these specimens and no elongation was observed after the specimens were unloaded.

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For laminates made with 143 cloth (see Figures 7, 8, and 9), the average values of ultimate tensile strength at 45° and 90° to the warp direction were approximately equal. These values at room temperature for 143 cloth with Class II (4232) resin, 143 cloth with Class III (506) resin, and 143 cloth with Class IV (828) resin were approximately 21, 15, and 20%, respectively, of the average strengths obtained for specimens whose long dimension was parallel to the warp direction.

A comparison at room temperature and 500 F of the tensile properties parallel to the warp direction of 120 and 183 cloths with Class II (4232), Class III (506), and Class IV (828) resins is shown in Figure 10. No secondary modulus was observed on specimens of 183 cloth with Class II (4232) resin at 500 F.

Of the four types of tensile failures that occurred, as shown in Figures 28-1 and 28-2, only types T(tension) and D(delamination) were observed on specimens of 181 cloth with Class II (4232) and Class III (506) resins. For these materials, a delamination type of failure was observed on all specimens tested at 45° to the direction of warp. Tensile failures of all specimens taken from panel 105 regardless of warp direction were delamination-type failures, as indicated in Table III.

Some specimens made with 143 cloth exhibited a U (unidirectional) type of failure, as shown in Figure 28-2. This type of failure occurred only on specimens whose long dimension was parallel to the warp direction. A fourth type of failure, designated S (shear), was observed on some specimens whose long dimension was 45° to the warp direction. This type is also shown in Figure 28-2.

All specimens taken from panels made with 181 type cloth and cut parallel to the direction of warp exceeded the requirements of specification FMS-0031(A) with the following exceptions, (see Tables III, IV and V):

Cloth & Resin Combination	Specimen No.	Treatment or Condition
181 cloth - Class III (506) resin	108-A-1 107-A-3 110-A-7 107-A-8	R. T. Wet Wet 1/2 hr. at 300 F
	110-A-3	1/2 hr. at 500 F
181 cloth - Class IV (828) resin	111-A-1 113-A-1 114-A-1 112-A-3	R. T. R. T. R. T. 1/2 hr. at 300 F 1/2 hr. at
		300 F

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Bearing Tests - Bearing yield strength, ultimate bearing strength and type of failure are recorded for each bearing specimen in Tables XI through XVIII. These results are shown in bar chart form in Figures 29 through 34. Stress-deformation curves for each condition are shown in Figures 35 through 49. The bearing data obtained from specimens of 143 cloth with Class IV (828) resin were not plotted in bar graph form because of erratic results. Figure 50 is a photograph showing the four typical failures in bearing tests. These four types were designated as bearing, shear, tension, and tension-shear.

Average values for ultimate bearing strength and bearing yield strength of specimens made with 181 cloth did not vary more than 10 to 15% with the direction of testing, as indicated by the data in Tables XI, XII, and XIII. All these specimens with the exception of specimens 107-C-1 and 107-A-5 (Table XII) exhibited bearing type failures.

Soaking at 20 and 40% of their average room temperature bearing ultimate strength for 100 hours had no significant effect on the bearing properties at 300 F for specimens of 181 cloth with Class II (4232) and Class III (506) resins. Average bearing strengths for specimens of 181 cloth with Class III (506) resin dropped approximately 8% of their room temperature strengths when tested at 500 F. This represented the least drop in room temperature bearing strength for all specimens tested at 500 F.

Although specimens of 181 cloth with Class IV (828) resin had the highest average room temperature bearing strength, the bearing properties at 300 F dropped to approximately one-half the room temperature average values, as is shown in Figure 31. Two specimens of this material were soaked at 300 F while loaded to 20% of their room temperature bearing strength. Failure occurred, however, before 100 hours of soak time was reached. The soak temperature for this material was then changed to 260 F. Three specimens were loaded to 20% and five to 40% of their room temperature bearing strength while soaking at 260 F for 100 hours. One of the specimens loaded to 20% and four of the specimens loaded to 40% failed before 100 hours of soak was reached, as recorded in Table XIII. Photographs of four of these failed specimens are shown in Figure 51.

For 181 cloth with Class IV (828) resin, testing at 500 F reduced the average bearing strength to approximatley 12% of the average strength at room temperature, as shown in Figure 31. This represented the greatest drop in strength with temperature for all fabric and resin combinations investigated. Some of these specimens tested at 500 F failed before the bearing hole was deformed

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to .0075"; therefore, deformation at failure instead of yield strength is recorded in the Tables for these specimens.

A comparison of the bearing properties for each test condition is shown in Figure 32 for 143 cloth with Class II (4232) resin and in Figure 33 for 143 cloth with Class III (506) resin. The properties decreased slightly with angle of warp for each condition.

A large number of bearing specimens which were made from 143 cloth and cut 90° to the direction of warp exhibited tension type failures, as is shown in Tables XIV, XV, and XVI. This was the result of poor tensile strength in this material in the 90° direction. Since a number of specimens made with 143 cloth failed before the bearing hole deformed .0075", deformation at failure was recorded in the Tables.

A comparison of the bearing properties, parallel to the warp direction, at room temperature and 500 F of 120 and 183 cloths with Class II (4232), Class III (506) and Class IV (828) resins is shown in Figure 34.

Compression Tests - As soon as compression tests are completed, the results will be published in an addendum to this report. Compression properties will be determined for the same conditions as shown in Table II. Two types of compression jigs and three means of measuring compressive strain will be evaluated.

CONCLUSIONS:

The results of this investigation consist of empirical data to be used in establishing design allowables at room and elevated temperatures for all combinations of the following glass fabrics and resins: Types 181, 143, 120, and 183 glass cloths with Class II (4232), Class III (506), and Class IV (828) type resins. From the data obtained, the following general conclusions are drawn:

- 1. The values for Poisson's ratio decrease with temperature for laminates made with 181 and 143 cloths.
- 2. Laminates made with 181 cloth have tensile strengths which are approximately equal at 0 and 90° to the warp direction and approximately twice the strength of the material at 45° to the warp direction.

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- 3. Exposures for 100 hours at 300 F at loads of 20 and 40% of room temperature ultimate tensile strength have no effect on the tensile properties at 300 F parallel to the warp direction for laminates made with 181 and 143 cloths.
- 4. Bearing properties of laminates made with 181 cloth are independent of warp direction.
- 5. Exposures for 100 hours at 300 F at loads of 20 and 40% of room temperature bearing strength have no effect on the bearing properties at 300 F for the following glass cloth and resin combinations: 181 cloth with Class II (4232) resin, 181 cloth with Class III (506) resin, and 143 cloth with Class II (4232) resin. Similar bearing loads at 300 F on laminates consisting of 181 cloth with Class IV (828) resin may cause failure before 100 hours of soak time is reached.

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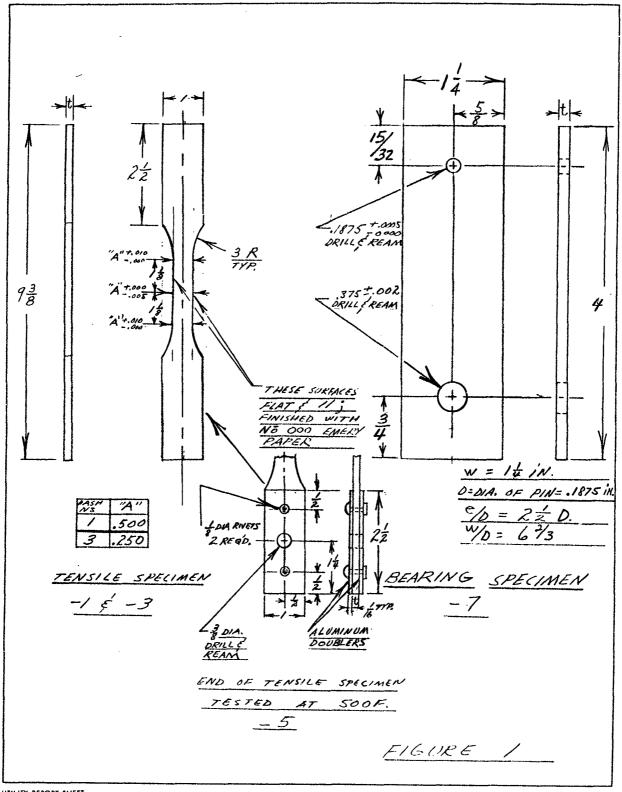
(FORT WORTH)

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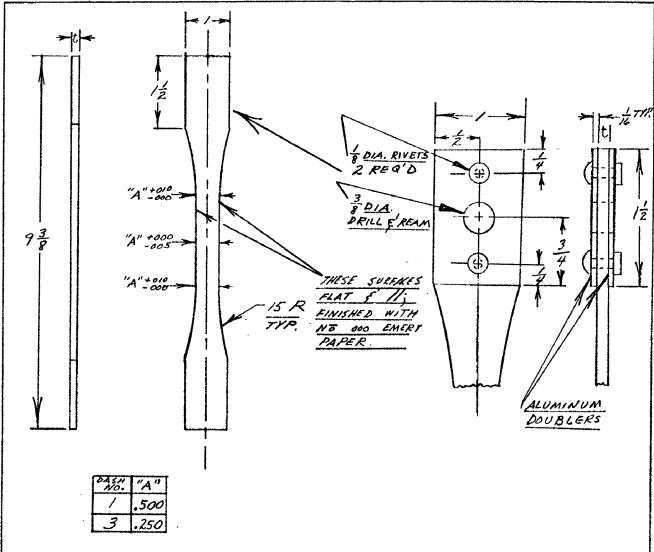
MODEL B-58

DATE 5-1-59



A DIVISION OF GENERAL DYNAMICS CORPORATION (FORT WORTH)

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UNIDIRECTIONAL TENSILE

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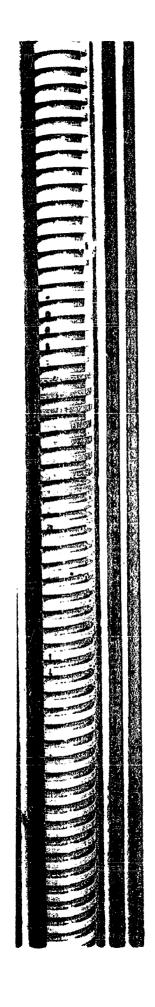
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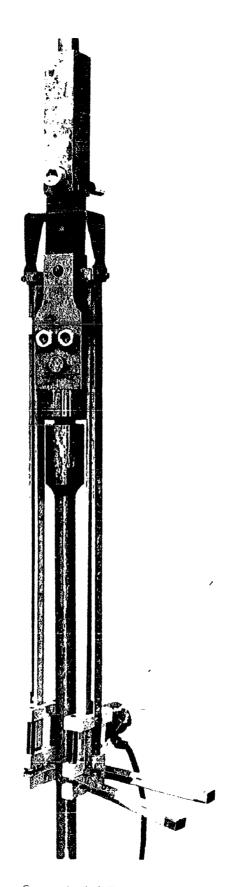
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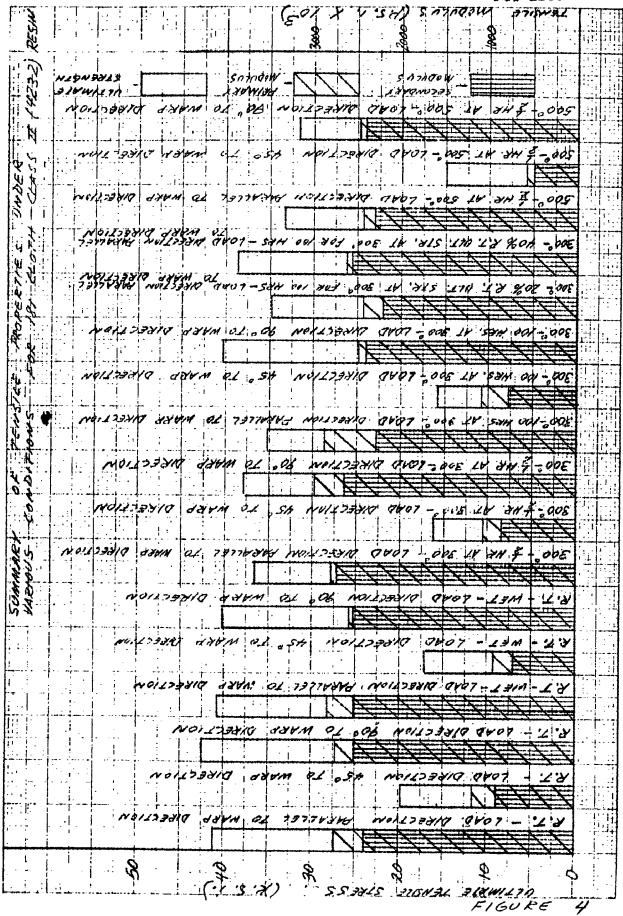
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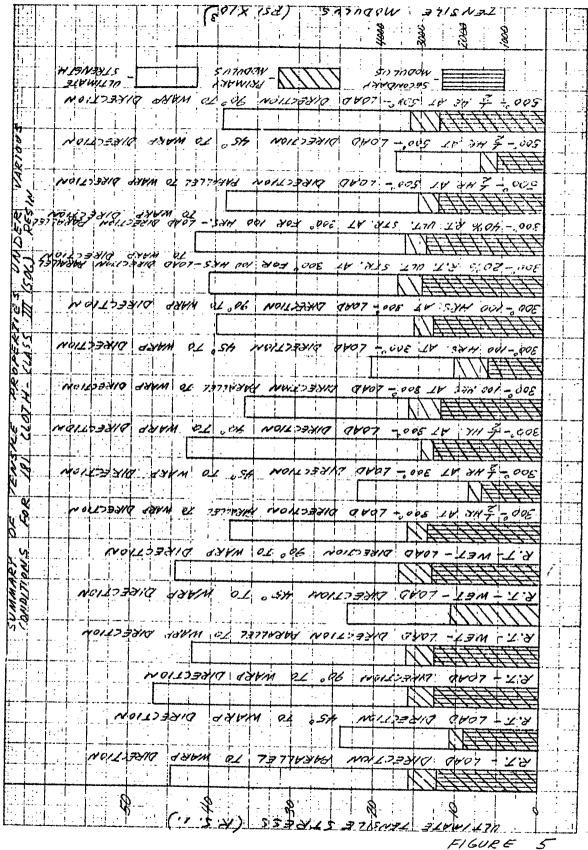
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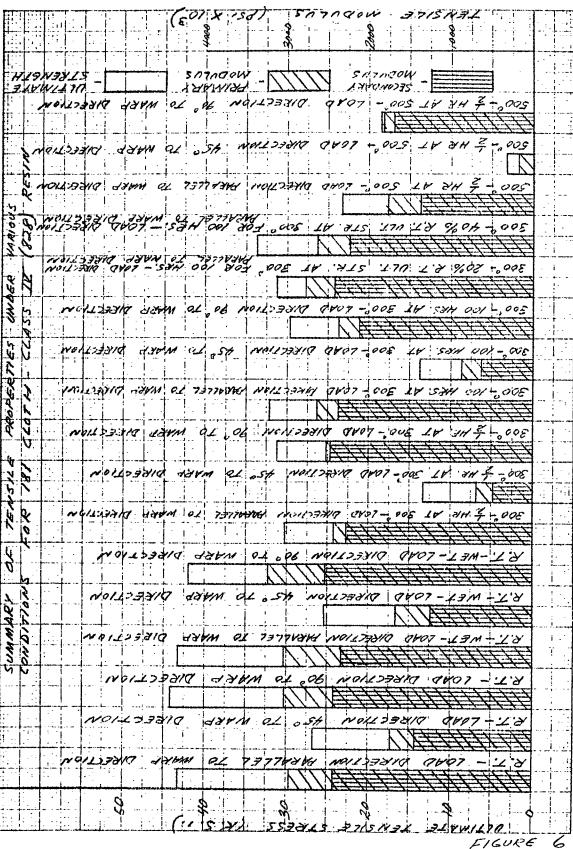




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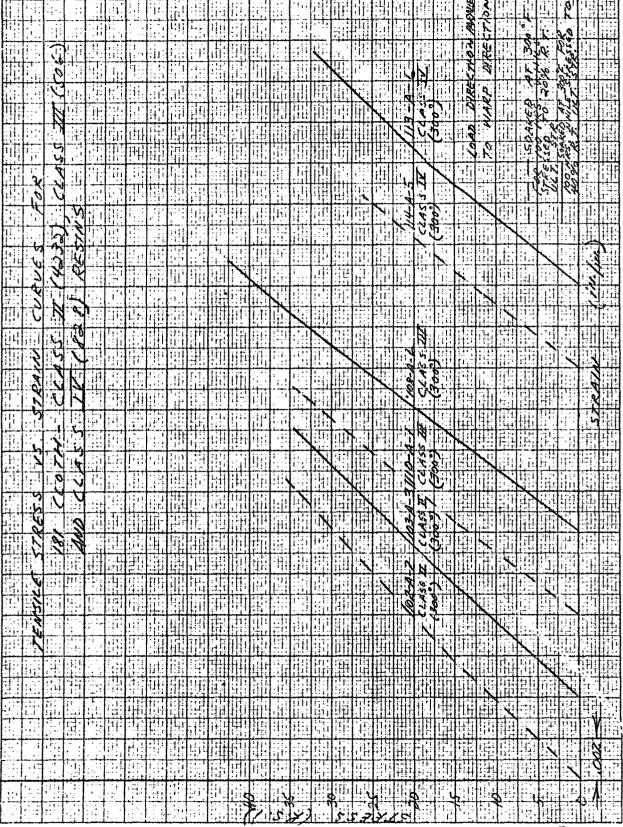
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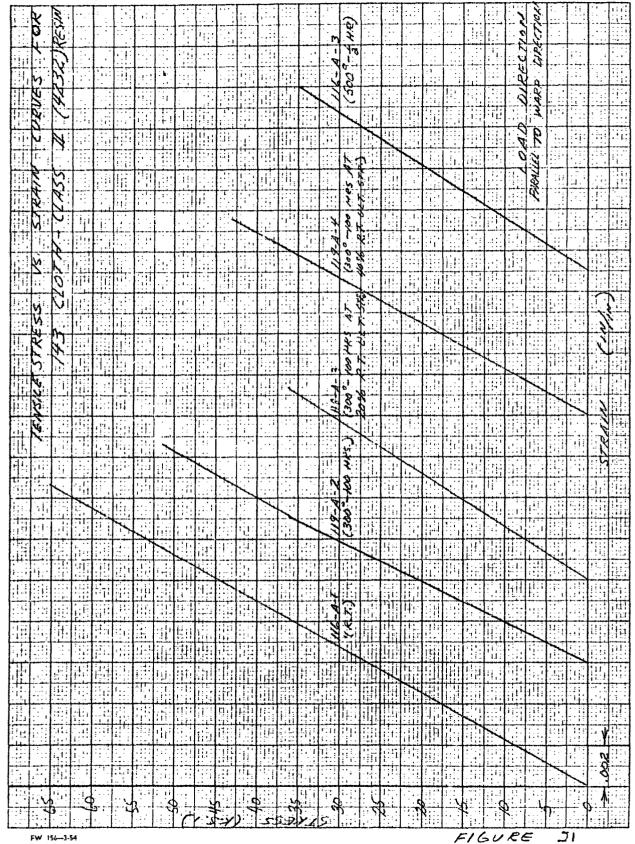
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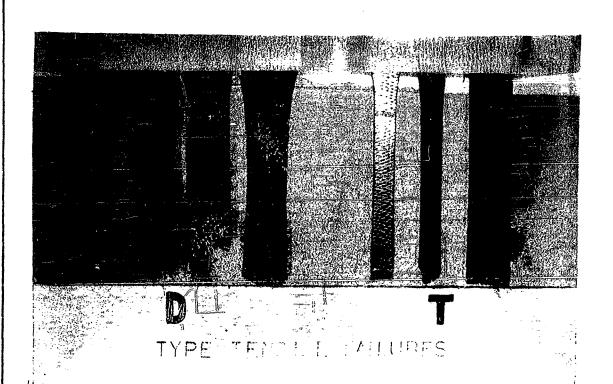
C O N V A I R A DIVISION OF GENERAL DYNAMICS CORPORATION (FORT WORTH)

PAGE 41

REPORT NO. FGT_2186

MODEL B-58

DATE 5-1-59



Mag. 1X

Typical Failure From Tensile Tests.

- D (Delamination) seemed to fail at the bond between cloths.
- T (Tension) failed across the specimen without delaminating.

Figure 28-1

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

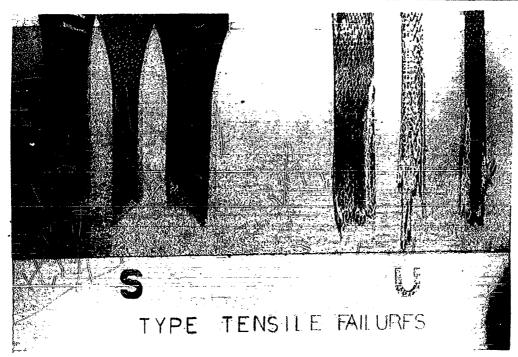
(FORT WORTH)

PAGE 42

REPORT NO FGT-2136

MODEL B-58

DATE 5-1-59



Mag. 1X

Typical Failures From Tensile Tests.

- S (Shear) failed on an angle of approximately 45° without delaminating.
- U (Unidirectional) fibrous type failure observed only on specimens made using 143 type cloth.

Figure 28-2

REPORT NO. EGT-2155 FORT WORTH DIVISION FORT WORTH, TEXAS DATE_ ... 5-1-59 7 K15/N3/7.15 31/W1170 17 2M2 315 14.26 24 18 mile 21/7 100 xx MOUS 5710 - days مهوروجي - 000 1000 110113717 PN17 + ORS IN DAY 5-000 2.50 WOLL > SOM 14 X MULTINE BY MANY DISPERSION NO12 2317 1007 200 وباه 7 NAS - 55.02 - 124H AN 201 , 60% 14 11 715 110 - OUR 7/01 7.3716 188 N. 13.20 1867 - 544 601 205 005 11 9/02 00E ۱٧. NOW STATE DIAME , \$6 101172417 0007 col de Nersonia dyrm 094 NOIL ZYYO 120 70007 000 300-190 15.) 120 DIRECTION PHYSICE TO WARE MOLKOZALO 7407 -008 11 Sty 1001-00E 0 MULDESTA CANA 1 00 7 10/173111 0007-105 -008 211 MULLOTHAM dova 5% קונבכלוטאן 7007 .005 ,000 שם נוניות מדבר אומא אמנינופיו NOV. X 23710 MARN OF م الراجع OGE 10 NAKH DIEGGLOW 1:12731117 7007 1 2 NOILIFAVO MANN 12% 25% 116/205010 1314 WAKE OIRECTION תמעופיביקלים ע 747743600 176000 3M 12/31 MAKE DARECTION 10 DB 101273010 0007-114 MARCH DIRECTION 2 05% NO112571011 8807 MALLAND J. From 22 73774741 NOLLON 0 ONUT FW 154-3-54 FIGURE Dept. 6

CONVAIR

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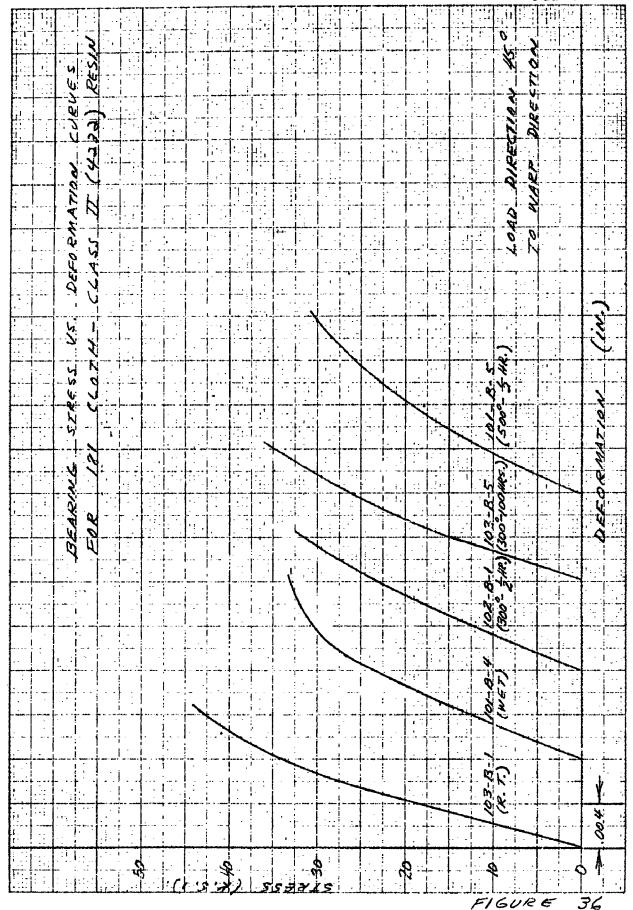
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PAGE... CONVAIR REPORT NO. FGT-2165 DATE 5-1-59 FORT WORTH DIVISION FORT WORTH, TEXAS 1 1 Ú 151 DIE L. Q V. Y ii: J. N. m 4 7 O 1 不定 4 K 11. 57.8 Ø 0,0 ii. .11.5 96 ::1: 1 3 % int ा । । 111 (500- 5/112) 11 111 iiii 16 4 .dijfik 1: FIGURE FW 154--3-54

Dept. 6

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FW 154--3-54 Dept. 6

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FIGURE 46

1000 DECTION PRINCE TO MARCHES TO MARCHINE TO MARCH DECTION POST T	RE 51M,			FGT-2126	
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Page 62 FGT-2186 FIGURE

(FORT WORTH)

REPORT NO. WGT-2186



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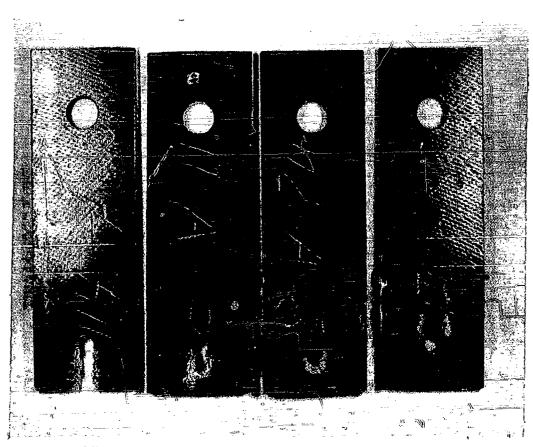
Figure 50

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CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION (FORT. WORTH)

PAGE	65
REPORT NO.	FGT-2186
MODEL	B-58
DATE	5-1-59



Mag. 1X

Bearing Failures From Sustained Load Tests.

Material - 181 Cloth - Class IV (326).

Temperature while loaded - 200 F - Load time 100 hrs. or less.

Loads from left to right - 21,020 psi, 21,020 psi, 21,020 psi, and 10,510 psi.

Figure 51

CONVAIR —FORT WORTH

TABLE I HISTORY AND PHYSICAL

PEST LAS Page 66 FGT-2186₁ WITH SECTION - ENGINEERING S PER SECOND PANELS ST DIELECTRED INSTRATION VRE CONSTANT FACTOR .0082 $\widehat{\mathcal{E}}$.0082 9800 KLOCKELES DANEL 200-2418.200-1242 250-1418.300-1242 300-12418.350-1412 200-24RS 200: \$ MC 20-7 W. 350-1 HE. 400°-1 HR. 200 - ZHK 200 - ZHK. 250-1 HR. 300 - ZHR. 250- 148.30- ± HR. 300- ZHR. 350-1 HR. 450°-1 4R 450°-1 ME 500°-2 ME POST 50-2 HE 450° 1 HR 500° 2 MEX 450°-1 HR. 500-3 HRS 200-248 200- 24R 450°-1 HR. 500°-2 HES 400- /HR. 250-14K. 30- ± 4R 300-24R. 350-1 HR. 200- ZURS, 200- = HR. 400°-1 MR 250-1 HR. 300- ± HR. 300- 24R. 850-1 HR FACTOR CHEMISTRY 72557 CYCLE 5/12 9 AND DISSIPPATION CURE .1270 VKUUM FIBERGLASS B ACCON PANIED 0401. THICKNESS MAX. MIN 6011 0621 FABRICATED 1398 1210 1283 1394 1375 j. OF っゃ NO. OF PLIES CONSTAN V V 3 SMEET PROPERTIES 3 PANELS BARCOL RESIN MARDNESS CONTENT 43.6 3 33.4 38.5 dorr. 37. 39 */STOAY DIELECTRIC THESE 200 19 1 1 1 OFLSEN ONLY TH AUG-57 JULY 57 302757 157 TABULATION SHEET AUG 157 AU6. 40 7×1PE RESIM 4232 3 3 3 CLOTH 001 102 105 10 1001 103

Page 67 FGT-2186 4 PROPERTIE 0+3 (3) WELECTRK OSSIPATION CONSTANT FACTOR 00/0. .0065 .0085 5210 08/0 0/2 0/10 PHYSICAL 5.0 5.2 5.6 5.2 m m 5 19RESS 350-2108,330-12108 150- 242 200-342 200-148 200-542 250-248 330-148 250- # HR300- # HR. 310- # HR 350- 2 HRS. VAKUUM 150- ZIR 200- ZIR 250-35MM. 30-1 ME. 250-144.300-14R. 200 - Zue 250 - Zue 30 - 1 MR. 450= +HR 200° / 4R.250° - \$4R. 60 RE 250-144,300- ±42 350°-2µES 400°-1 H.P. 310° -- 350°-2418, 400-1 MR. POST 200-2455200-24e. 400-14E 450% 148 350°-148 350 -2 MES, H1570RY AND PANELS CURE CURE 7857 1005 0860 THICKNESS MAX MIN 1375.1187 7, 1210 2601 0111. .1100 I (coure) LIBERGLASS NO. OF THICK 0111 1520 1355 1330 .1290 111. 6281 15 HARDWESS CONTENT PLIES 5 3 1 3 74BLE 30.1 27.3 32.5 26.5 40.0 RESIN 6 0 4 31.1 BARCOL 00 m 10 60 2 OCT. 57 MARCH 57 APRIL '57 15, NON 2047 57 SEPT'S7 TABULATION SHEET OCT '57 CZ, 12 CONVAIR --- FORT WORTH CLOTH RESIN 506 828 PANEL 100 101 801 9 20 ?

Page 66 FGT-2166

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7 6 7							 			i 					 			0	(3))	(3)	1	9	(2)	· · · · · · · · · · · · · · · · · · ·			 	 		: :				
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	DIELECTER DISCIPATION	CONSTANT	3	5.5						1. (v)						! !	7:7	5.1		İ	5,8	1	, v	!		6.2						†			_
141 STA	750	CUEE	•	2003 ZHR	300-7HR.	300- ± 48.350-14R.	400 = 1 MR.	AH1=05/	SON 2 HIPS.	200- 248	250° = 740	300:1 HE	350°-24B	400-1HR	450°- /HP	500 3 NE			30-2K	550-74PS.	300- ZUR	44	300-24P	48300- 5HE	350°24ES	10-24R,	250-4 HE.	300-14R,	350-748	400°-14R.					
NAG		1		200-ZHES 200: 54R	250= 14R. 300- +HR.	300° 248			500°27HBS.	200-2HRS	250º1 HR.	300- ZHE.							275°-171	<u> </u>	275- 1248 300-2	77001	K/5-(242500	275-1548	:	150- ZWE	200 - 1 MP.	250-24R 300-1			 				-
7867	TYPE	CURE		VRUUM													>		PRESS 275-1748 30- 24R.	ļ			-			VACUUM 150- 24220-248,	¥								
1	655		(14)	.1115						,1020							.1126	9/0/	2880.		5%0		08/0	1048 .0912		5///									
BERGIAS	ングングイ	MAX. MIX	(14.)	1280						1220							8781.	06//	0/0/		4460.	0101	9/07	8401		1340									_
· `	NO. OF	DK1ES		12						***************************************									12		12	c,	y)	12		-									
070		CANTENT	%	39.2						31.4							3/.1	40.4	30.1		25.7	0 /6	9	27.8		33.8									
		u		70						89							68	69	89		69	1,	,,	67		7									_
SHEET		2000		MAY 157						MAY '57							SEPT '57	MARCH 58	056 '57		180,23	100,100	76 37	DEC 57		July '57						-			_
TABULATION SHEET	TYPE	RESIN	$\overline{}$	4232					-										506				-	>		828									_
ABULA		CLOTH		143			 	 		-	-								143						-	(43					_		 	-	
_	PANEL	10.		116						117							113	119	121		122	173	7	124	-	126						!!		!	

CONVAIR -- FORT WORTH

PROPERTIES PHYSICAL ANO HISTORY (conto.) 7486E I

(2)
POST DIELECTROWSHAMON FACTOR 065 000 0/0. 0 0 CONSTANT 400-1 µ2 450-1 µ2 200-2 µ2, 200-2 µ2 250-1 µ2 \$10-2 µ2 300-2 µ2 300-2 µ2 300-2 µ2 200-248 200-248 350-148 905-248 900-248 350-148 1290 VALUUM 200-748, 200-748 400-14E 450-14E 500-24ES 1339 1200 VACUUM 150: \$ 48.200: \$48. 350-2 HES. 200-14R,200- \$ 48. 350°-24185 150 = 248 200 = 248 200-148,250-248 100-1 HE. 250-2 HR300-1 HK 200-1 HR 250-7 HR 406- /HR 350 248. 300° ± 412.350° 1 42. 250- 2 JR 300-1 HE 250° ± 418,300°-1 418 400-148 450-146 500°-24ES CYCLE CURE TYPE イモミン MAX. MIN. 1224 110 1170 .//65 FIBERGLASS 1372 1355 1250 1343 1/375 Ž. S=17d 3 80 1 3 BARCOL RESIN NO HARDNESS CONTENT PL 32.7 37.4 43.9 47.4 £.5 46. 65 e 74 1 828 JULY 57 JULY '57 JULY 157 157 MAY'57 4232 MAY '57 TABULATION SHEET MAX XE511 TYPE TYPE CLOTH 143 20 33 10 3

Page 69

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PROPERTIES PHYSICAL ANA HISTO.RY TABLE I (CONTA)

Page 70 FGT-2186 DIELECTRICUSSIFIATION 610 .000 8 010 .010 9/0 .010 0 250- 240- 200- 240 4.8 250- 240-300- 340 4.8 5.2 m 0 4.6 450°-14E 500°-2418. DANELS CURE POST CYCLE CURE 1270 -1240 WKUUM 200:248 200-748 250-148 300-248 300 = 7 HR, 3502 / HR 400°-14R 255-54K 300-54R 33.1292 MCUUM 150= 5448,200= 740 350 22 HPS 350° 24185. 250-4HR. 30:1 HR. 350°-24K. 350°2HB 250° 544 300°-14E. 400- /HR. 150-24R. 200-24R 200-142,250: +HE 250- 1-4E 300-14E 350 -ZHES. 150-54R. 200-+4E 200-148.20: ±42. 350 - 2HRS 400:1 HR 400-1HR. 55.704 MIN. CURE アイアの アアライ THICKNESS 0 1186 1150 1176 .1200 .1150 (3) 1314 113 MO. OF THICK MAX (111.) 1264 1364 1132 #811 BAROL RESIN NO. OF HARDNESS CONTENT PLIES 25 20 25 25 00 00 26 18.4 44.9 25.4 36.9 35.5 m 7 56.8 10/0 38. 45. 70 63 2 7 4 1 4232 MAY 157 MARCUST MARCH'S7 15, XVW MAY'57 828 Jury 57 JULY 57 MARCH ST PVDE DATE 506 KLOTA 20 0,0 120 DANEL 134 137 130 139 100 1 1

PROPERTIES PHYSICAL AND TABLE I. (CONTD.) HISTORY

Page 71 FGT-2 G6 FACTUR DIELECTRIC DISSIDATION
CONSTANT FACTOR .0070 .0093 .0055 0800 ρ. ω 250-1 HP 300- 14 HP. 300- 248, 356-1 HP. 450°1 µR 500°1 µR 500°2 µK 30°-544, 350°-544 30°-544, 350°-748 350°-24E. 1034 Mew M 150-148 200-148 200-148 250-148 250-148 200 - 2 MK, 200- 2 MR 1322.1240 VACUUM 200.2418,250.5418 350-2 ME. 400°-1 HR 200° 2445, 200° 2445 JED: 1 MC 250-148350-\$110 300-\$110 30-140 CYCLG CURG 4500-146 200-245,200- 14 300° ZWR 350° 1 MR 4502-142 500-34B 250-1 HR 350° ZUR 400-14E 500 - 2 Wes DANELS THICKNESS TYPE 1200 1175 1120 190 (IN) -1069 1225 1200 FIBER GLASS HARONES CONTENT PLIES 25 N 36.6 25.3 RESIN 32.4 34.3 * シク =18C0C 67 'n 0 157 MAY 57 15,90 828 450 4232 Jul MAY TYPE TYPE WOTH RESIM 2 50 PAWEL NO. 831 1/1/1/ 17 0 2/1/ (F)

TABLE I (CONTD.) HISTORY AND PHYSICAL

																																F	age GT-	æ [-2]	72 186 		
Call Xallow	(2)	DISTIPUTON FACTOR	(9)	.01/		011		0/2	8	200		1	* 5	-			2/0					9/0	<u> </u>				2/0										
		CONSTANT FACTOR	(3)	5.0		5. /		4.8	47	+		77		-			5.6	,	 			5.5					5.5	 	 			-	<u> </u>	 			
	2000	CURE		250-7 HR 300. 2 HR.	350°2 HRS.	150-2HR 300-2HR	350-ZHRS	150-248 300-24R	290- # JR 140 + 110	2500 2 mg	CAMP, CAMP	VA:UUM 150°- 211 700°-4 41	200-1 MR 250- + MP	250-14P 300-14P	350-2 MBS.	400°-14P.	150-248 200-748	200°-14R 230°-54R	250 - 7 WE 300- 1 HR.	350°-24125	\Box	_	200° 14R 250° ± 4R	: ZWR 300 - 1 WR	350.2405.	100°-14E	-ZHR 200 - ZHR	14R 250° + 4R.	250° = 742,300-14R.	350°-ZHR	400°-14P						
,	55 TYPE (URE	CURE		160 ARESS 23			6211	+	1194 11 29		í l	1159 VA:UUM 150	007	230			70 /50	200	255		+	+	500	730		+		200	259	>							
CIBER61ASS	THICKNESS	- -	1	05.57.	1797	·	11 08/1.	-	. 1280 . 11		├ ┤	.///0 ///.					1/580 .//				1230	74707				611	. 1180 . 1150										
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70	BARCOL RESIM	CONTEN	200		30.5		36.1		27.0			30.3				2000	36.3				31.9					30.00		1	+		-+	-		-	-		
	BARCOL	HAKONESS	57		73		73		58		0/	67				0	9				7				-	1/2			+		+		+	+			
	247.6 860.60	1	MARCH 57		MARCH 'S7		MARCH 57		APRIL '57		10/02	15/10				MAY 157					MAY '57					AUGIST'S7			-		-	-	+	-			
Į	30/1/2 B	#	506	_		-		-			020	020														7			>		1	+-	 	-		 	
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CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION (FORT WORTH)

PAGE 73

REPORT NO. FGT-2186

MODEL B-58

DATE 5-1-59

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1000	<u> 7</u> 64	EST					N.				1		R10			IONS	_	الآ	000	1/4/1/	
X X S S S X X X	G47	433		HO	K1		14/		_^	63.			m	8/4	217		<u>-</u>	SPECIMEN	1	DETERMINA	
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à A			WET	WEZ	NE7	- HR.	ZHR.	- HR	_	1001		297	3 4 6 2 4 6 2 4	1K	W.	- 1116			71		
STORES TO STORE O	Į,	k.		-							0	0 0 0 0 0 0 0 0 0	0 100	y'I	20	2		9/3	3 1		
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720	\$	8	0	45	8	0	45	8	0	名	&	0	0	0	45	8				•	

TABLE III TENSILE TESTS

NOT VIOLET	SHEET			101	į	;				-		
	(1) ANGLE	(2)	PROPORTION	101	1073	11/	77)	955		4232)	RESIN	
SPECIMEN NO.	LOADING	AREA	PRIMARY	SECONDARY	MOD	1000000 S	ULTIMATE	TYPE	1055/00	7857		
	(DEGREES)	(in. 2)	(isd)	1001	(70,000)	71 =		FAILURE	K4710	TEMP.	CONDITION	•
101-4-6	0	.0577	20/1/	150	OLA IO	CONTE	153			(F)		
102-4-4		0/10	00977		0/20		000/1/	_	.099	A. 7.		
103-A-4		7000			01550		39 500	1	580.			
105-4-1	\	.0373			2820		45,700	7	067	1		
AVEDACE.		1110	15,500	00414	2670		00414	9	.093			
JOE VAIGE					27/3	2390	11 300		100			
7-8-101									9	+		
(2,10)	45	8190.	5,200	8.100	1090	000	10 400	4	(
102-8-4		1090	5.200	0000	200	\top	18,700	3	.39			
103-8-1	-3	1150	5 200	200	10001	T	17800	0	127			
104-13-1		2 / 2	2000	I	1680	П	20,700	9	0,4.			-
AVERAGE		9000	6630	2/100	0/10	1020	22,200	0	29	 		
		1			1165	\neg	17,800	ĺ	332	+-		
5-2-101	9	2010					-					
107-1-4	20	. Ceos	00814		2800		411 800	1	0/0		•	
113 (1)			9,900	3	2890	2780	100 200	1	9 9	+	110E/18/65 #	ľ
103-6-4	*		7,400	1	2800	7-	2010	+	00%		はなるである。	1 0000 JEN
1-2-601			17 200	277.00	7 70 7	35,0	26,100	-	190			
AVERAGE			2	200	3500	9000	13 000	7	079			
					01/2	4511	12,050		0785			
101-4-5	0	1860.	12 500	0011 117							į	
102-4-5		2/22	12,500 44,400	27,400		+	47.400	1		 	11/6 7 (3)	
103-1-7	1	1_	6,600 37,800	27,800		2340 3	37,800	0			7 2 7	
105-4-7	+		00/18		2790	70578	12.100	1		-		
ч.Н	1	036/	22,200	36,700	08 90		42.800	<		+		
Jever de		1			2780	2515 4	46 775	1	+	+		
101.8.3	T	-+								1		
0-0-101	45	_+	3,200	7,300	970	790 /	17000	<		-		
102-8-3	+		6,100 9	,500	870	}	100/	10	-	+		
104-8-0	*	7870		8,300	0,88		41 300			+		
ALEBACE	+		5 500	8,000	1020	-	15,700	><		+		!
HILLANDS	+	+			935	\vdash	7025	3	+	-		
#-7-101	50								+	+		Pa FC
1020	+	_	17,500 34,600		3680	2630 4	4130	1	+	+		EC (PE
102-6-5	1		19,600 3			↓	2000	 	-	+		e '
7-1-301	*	+-	6,900	0	2570		3:900	1		+		74. 18
MIEDAL		0686 3	22	. 8	2400	1	30	\ \ \		+	\	6
(1) - ANGLA	RETUIE			3	575	2575 2555 40 250	10,000	3		+		
(2) - AREA	INC. COL		AND WARP	MARP	PECTION	10 52	Specker	No	+	+		
(S) SOAKED I	IN BOILING DISTILLED	5 DISTIL	W 037	WATER FOR	ξη η Ο 10 1	SPECYPIA	<u>S</u>	APPROXIM,	47561	,Q	みが	
		:			1	3:	WW MANIEDIATEL	MELL	TESTES	,	_	TEMPERATUEL

TENSILE TESTS	,	(4232) RESIN	TO TEMP CONDITION	L	300 SOAKED IT 31,2	FOR 1/2 4R.																		SOAKED AT	5+ LOK 100 HPS.								l:]/	(a)	-2		,	
YEN) 17 5	[r.]									-	-	<u> </u>		-		ļ 	-	-	-	 	270	000	100		890.			-					 			
$\overline{}$		OLTIMATE TYPE	FAILURE		-	1	9	0	<u>ل</u> ما			0]			1	1		5			9						1	9	9	9		1	-	1	9	
970.	,	ULTIMA;			31,600	24.50	36,400	43,800	36,525		14.600	16,500	11 400	10 400	16 475		34000	COP 14	2000	32 900	37,650		2,500	33,200	34,800	41,330	35,150	0	0001	5,300	1000	200	052/50	000 74	40 80	4,500	00977	00011
TABLE III (CONTO.)	;	7 5	PRIMARY SECONDARY	COIXIST.	0110	33.40	9670		2673	- 1	750	098	2/10	080,	850		25 40	2950	2530	25.40	3640		2350	-	2350		22,80	210	4	280	+	-	7-		 	7 00/10		
	,	MODULU	MARK	2,01X/01		000	20,00	2001	21630	_ 	260	046	006		053			3400 =	C 0856							2680		970	+	-{-	1	1	1	0/		50 00	500	3
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		DAOD	(PC.)	28 100		1	1	٦.		11 30	1,300	5,400	5,000	3,800			14,500	50,	1000	2 500			8,600	7	8,600			2,800	3.700	4 ~ 3	3,800			27,800	36,000	0000	201/2	
		(3)	Trong /	03/1	. 0587	0568	75.90			1164	2000	0670	0/20	0665		2000	5050		\.\.	000		2000	0500	1000	0576	7897		0617	3609	₩-	5290		† †		6		0	
VORTH	りてに	DANGLE	DEGREES	0		7				77	-	1	-	†	1	00	1	<u> </u>	-	-		(1	+	+	+		7. 5%	,	2	9.			90	7		<u>}</u>	_
					9-	5	Y	-			0	3/	2	! .	+-		-		1	-	+	1	1	10		-			5	h:	4	-	-		1		-	
CONVAIR — FORT WORTH	לן לו	7		1-4-1	102-4-	5-A-5	7-4-40	AVERAGE		1-8-1	102-R-2	/3- 8-7	0-0-77	ALE PACE		101-6-1	02-0	17	10401	41,5000	0	1	tl Y	9-1-60	シーアーカ	4)ERAGE		4-8-10,	5-8-70	103-6-5	2	TEKAGE	1	マーン・ハウ	イントのク	5-2-50	ERAGE	
8 4		SPECIMEN		-101	0	0	10	AVE	ļ	101	2	1	1/2	4116		10/	01		10/	47.16		-101	1	2	401	AVEX		10	0	0	0/0	MYCK	191	200	19	10:	AVEK	

TABLE TE (CONTO.) TENSILE TESTS

				FOR	Cracker	17.55 ST. 5	1000	Ų	0 77	OT PECCEN	1-63-0	, (1) le	ار																	I I	່ງຄາ ໃຊ້ໃ	;e l'-:	70 21	6			
7		40		300%	7/1/6	1 4	ころの しし	17 17400	7000	7/17/		1			500° F	477																					
MISTA 1 CECT	102V / 7	CONDITION		SOAKED AT	l٧	200	0100		SOAKED AT		19 26	1875	۱ ۲		SOAKED AT	//																					
7/42			(2°)	300	ļ			7	1			7/7			5000	_										+		>									
K v	* II	FAILURE		9	`	1	~		9	1	9] [/	0	9	0		9	0	9			4	2	9	\\rac{1}{2}	0								
		, S.	(1251)	36,800	35 400	33 700	000 1%	34 975	32,900	40,200	43 100	39 000	38,800	.	33,930	30,300	40,400	28 900	33.375	9.500	10,500	004.01	9900	10,075	0000	20,000	36, 700	32,500	33,500	36,700	`						
1	MODULUS	SECONDORY	(BIXID)		2250	2160	ì	2305		0498	0150		2575		- 1	2270			2305		520		480	500			27.90			2480						 	
CLOTH	1	~~	(PS/XIO)		2520		L	2423	22,00		2700		EE78			2610	08HE	2030	3428	260	057	540	250	585	2670	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2000	0,220	0000	3405							
18/	Perional	SECON DARY	(32)	- 1		٠,				40,200	37,600			000	١	30,300					6,200	•	5,400			000 10											
	PROPERT	MINARRY	(FS)/		4	17.50			3	17,600	18,300	,		4.7 "	16,600	00000	26,300	300 300		6,400	3,600	5,000	3,400		25700	000 01	27/00	27.80	0/200	`							
	32	[]	_	.05/4	.0417	. 0303	.0315		 ·03/8	.0284	.0274	.0315		0000	0000	1170	.0282	.0320		.0310	1870.	.0288	0350		1620	1202	0287	0337	- 1						-		-
SHEET	WANGLE	Presente	Westers)	S -		>	_		0		>			<) -		-			45		->			06		=		*								
TABULATION	SPECIMEN NO		1	101-4-6	102-4-6	103-4-6	104-4-3	AVERAGE	101-4-3	``.'	103-4-5	104-4-4	AVERAGE	101.11.4	1	102-4-1		103-4-6	AVERAGE	101-8-2	102-8-3	103-8-4	104-8-3	AVEKAGE	101-6-3	102-6-3	103-6-3	104-6-3	١,	MUCHEE							

TABLE IT TENEME TESTS

Colored Colo	25.00 25.30 25.30 25.30 25.30 24.70 24.65 24.65	21, 200 D 21, 200 D	18 18 18 18 18 18 18 18 18 18 18 18 18 1	TEMP CONDITION (9F) R. T.	
Cocces (m.2) (psy) (25.30 25.30 25.30 24.70 246.5 246.5 2700	>#	18 18 18 18 18 18 18 18 18 18 18 18 18 1		
2	2540 2540 2465 2465 2465 2700			7.	
2	23700 2470 2470 2470 2470 2470 2470 2470 2			×.	<u> </u>
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SHEET CONVAIR — FORT WORTH TABULATION

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TABLE IL (CONT.D.) TENSILE TESTS

FOR STREET TO 40% OF ROOM TEMP. 300 SOAKED AT 300% FOR 100 HBS. WHILE STRESSE 70 20% OF ROW TEMP. ULTIMATE TS. VALUE FOR ULTIMATE T.S. VALUE AT 500° F. SOAKED AT 300'E Winne TWDE TEST TEMP CONDITION SOAKED 200860 300 1 200 40 16 (2) PROPRESSIONAL MODULUS WITHWITE 177-6.
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TABLE I TENSILE TESTS

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VEL BETWEEN LOAD MUD WARP 5033 42 000 TO SECTION OF SECTIONS OF SECTIONS (APPROXIMATELY IN THE AP IN COLUMG DISTULED WATER FOR 3 115. AND HANEDIATELY TESTED AT ROOM	114-6-2		17850	1000	_	+		300	7		>		36
VELLE BETWEEN LOAD MUD WARP DOSS 3538 42000 REA MICLUSED TO MORATE WIDTH OF SISCIMEN (APPROXIMATELY IN AR IN) KED IN GOLLING DISTILLED WATER FOR 3 115. AND HANEDIATELY TESTED AT ROOM	AVERAGE			2014	2007	170	OF OFER	522	7				
INCLUDED TO MOLATE WIDTH OF SPECIAL (APPROXIMATELY IN DR I ") IN BOILING DISTILLED WATER FOR 3 1.5. AND MINISDIATELY TESTED AT ROOM	(1) - ANGLE	JΊ	0401 W	ann	0 0000	2000	538 42	020		-	 		
IN BOILING DISTILLED WATER FOR 3 1.5. AND MINISDIATELY TESTED AT ROOM	(A) = A/KEA	'n	0 70	WOLLAY	SOLVE IN	2000	10,000	Specker	200		1.		
THE MAN TO STED AT ROOM	C) SOAKED	11 601118	6 WST/2	KED 174	TER FO	31	CANA.	200000	STAN STAN	47641	on.	トシー	
					•	; }		10000	17016	TESTEL			PERATURE

TABLE IN (CONTD.) TENSILE TESTS

Page 51 FGT-2156 3000 300°F XXX, XX CONDITION 4 00 SOAKED SOAKED FOR S IL (828) E POISSUNS TE ST ME BATIO TEMP CON (0F) 300 FAILURE RATIO 0728 180. .071 150. WILMATE TYPE 9 'Ω 0 NP S 590 5,000 550 5,000 478 3335 MODULUS WIIMATE PRIMARY SECURIOR T. S. PSIXIO3 (PSIXIO3) (PSI) 30,400 28,600 31,400 29,700 2 500 31 200 31 450 2,300 1,2,300 13225 520 14400 29,700 000040000 2120 25,700 03/52 7886 1.2,400 15,600 057:31 23,700 29,800 2:300 00/ 30 2280 2800 2280 2190 2310 2495 2200 CLOTH 730 045 2438 2370 2430 2530 34,600 2980 2520 620 730 430 2510 3/40 269 2230 05% ,000 39,700 2490 2563 873 2500 2750 2390 750 810 PRIMARY SCONDARY 6,000 6,600 .0593 13,500 31,400 PROPORTIONAL 12,900 31,200 3,600 4,000 11,300 40,000 14,800 39,100 4000 300 . 0658 28,600 . 0593 /3,500 5-6 3,600 3,800 2,000 3,600 2,100 0265 17 900 29.700 34 100 PSI 2,700 300 2,400 15,300 13,900 AREA 4590. 6274 .0672 .0559 LVI. 0602 0652 0640 0557 1590 0663 0493 0349 3 0590 0565 0.621 DANGLE LOADING DEGREES) TABULATION SHEET 15 9 45 20 0 112-4-3 11-0-4 113-6-4 111-8-2 3-6-3 5-5-61 AVERAGE AVERAGE 14-8-5 13-4-4 12-4-4 7-7-41 11-B-4 12-8-4 14-13-41 AVERAGE 13-8-4 111-0-4 11-6-3 AVERAGE AVERAGE 4VERAGE SPECIMEN

CONVAIR -- FORT WORTH

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TABLE I (CONTO.) TENSILE TESTS

STRESSED TO 40 % OF ROOM TEMP. SOAKED AT 300% FOR 100 HOS. WHILE STRESSE 70 20% OF ROW TEMP. FOR VALUE AT 500°F SOAKED AT 300'E AR CONDITION 7.5 RESIN 1/4 ULTIMATE SOAKED FOR - CLASS IV (228) PRIMARY SECURDARY PRIMARY SECUNDARY 1: S. FAILURE TEMP. (P.S.) (PS.) (PS.) (PS.) (P.S.) (P.S.) (P.S.) (P.S.) (P.S.) 500 NK 1 ٢ 200 0 1530 23500 980 19,100 1650 27,440 1388 23,333 15,300 30,400 2880 2340 31,400 12,600 25,700 3230 2870 25,700 12,600 25,700 3230 2870 25,700 2390 32,100 35,600 2450 32,400 35,400 3 300 4 200 5 300 3 300 3 350 (H) 2090 MODULUS CLOTH 2350 3060 1870 2040 150 330 200 2 .0326 13000 --- 03360 .0334 9000 23500 .0310 9 400 15800 .0285 12,800 25,200 11,300 35,600 18,800 32,100 PROPERTONAL · OZ86 38, 400 2,400 0056 0290 COANGE W. 0573 .0303 1620. .0273 6.339 .0368 0322 . 0300 .0309 TABULATION SHEET 0 0 0 113-13-5 40 11-4-7. 12-8-51 AVERAGE **duerace** 111-8-5 113-4-5 13-4-6 14-4-6 13-4-7 AVERAGE 112-4-6 111-4-6 AVERAGE 14-4-7 2-4-11 12-4-5 SPECIMEN

Ų DPUBLE 740 RVET 1 X IN BEAKING (4) - FAILED

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1800 K TEMP, ICONDITION 7 RESIN SOAKED (4232 15 Test 300 (Je) 75575 .056 .73 S. FAILURE RATIO Assied. .046 ,032 163 TENSILE CLASS WITHATE TIPE 22 22 NA 2 M V 4340 4050 60,800 4350 4490 62,800 5250 4490 62,800 630 8,100 53, 100 51, 100 51, 300 180 12,230 770 12,500 1110 12,130 810 12,130 60,00 00811 9,400 5266 CO, 01 11,600 235 48 JEH (Seximose) (Sexis) 4830 H360 5330 H325 5330 H325 0009 080 470 047 575 560 500 MODULUS CLOTH 3710 1020 930 089 803 700 870 758 07/ 780 820 8011 74BLE 19,000 (0,800 90979 53,00 600 4,500 700 800 200 400 800 200 74000000 14,500 2,600 009 36,600 5 300 3,200 2,400 4,300 4600 2600 5.600 42,100 600 3,100 300 (E) 4 25.50 .05% .0546 .0576 0.298 2490 6850 8850. .0643 4190 (in) 0633 0302 .0523 ,0304 AREA 0587 1150 1290. WANGLE LONDING ! SHEET 45 0 CONVAIR -- FORT WORTH 0 O O. 4 TABULATION 118-4-2 116-8-2 18-18-1 16-4-2 7-18-2 17-8-1 1-5-6 10 AVERAGE 19-4-1 1/6-5-1 1-2-6 AVERAGE 1-8-6 AVERAGE AVERAGE AVERAGE 116-18-1 ľ SPECIMEN

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TABLE IT (CONTO.) TENSILE TESTS

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4-4-41	0	1	\\\ \ \	i	(10.00)	(SIXIO)	135,1		(20)				İ
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111-13-3		.0295	3	4,400	440	33	1 2.5	, ,		-	-		
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TABLE VI TENSILE TESTS

300°E. Ł CONDITION 47 0 5 SOAKED TN FOR Š ALUKE RATIO TEMP CO \$ Possin's Test * 300 (APPROXIMATELY 49 .265 37 .060 0 14:6:4 V ļη n 65, 700 3 56.90 56.30 (4,400) 0 6.290 56.80 65,700 5850 5455 65,575 9,200 1000 7:300 6,400 278, 7000 7,000 00/00 6,2,00 70 9,600 500 DIRECTIONS OF 670 630 510 CLOTH PSI) (PSI) (PSIXIO) (PSIXIO) 08 4 2 2340 64,400 5320 0es/ 0261 2210 2260 2200 5550 1230 2050 0641 0110 0691 1370 60, WARP .0495 76000 .0457 73.20 .0478 30,400 75,100 .0537 72,200 1,200 15,700 7.600 208 1000 700 500 6,100 500 7 MOICATE 005/79 3,000 005 5,200 5,100 400 900 009 3,900 41,800 2,900 0440 3, 500 51,500 3,100 0493 2,600 3,700 0503 3 CAND , 0263 , 0437 , 0264 , 0275 WWELE (2) LOADING AREA (DELREES) (IN) .0462 4640. .0535 ,0239 1640 .0431 4520 1240. 1640. 0442 8140. 2 WCLUDED 7 SHEET 9.0 90 45 0 0 4 **TABULATION** 121-8-2 122-8-2 123-8-2 11 WAY 121-C-2 122-C-2 123-C-2 24-8-2 123-4-2 121-A-1 122-A-1 123-A-1 AVERASE 122-8-1 123-8-1 124-5-1 21-4-2 100 122-4-2 176816E 123-6-1 121-0-1 AVERAGE 121-18-1 AVERAGE AVERAGE AVERAGE SPECIMEN

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TABLE VII (CONTIN) TENSILE TESTS

4 5000 10 CONDITION A 7, SOMKED 506) FOR TEMP. 500 7537 FAILURE ASS TYPE Q 4 0 00 n 1 CLOTH- CLA 57.500 47.900 54.000 55.500 53.725 2,900 5,800 2 100 2002 / 7.5 200 PROZORTIZMAC MODULUS V PRIMARY SKOMBARY PRIMARY SKOWDARY (PSI) (PSI) (TSIXIC) (PSIXIO) 620 0 620 5780 5380 8745 1353 1210 5220 0645 1030 0957 0811 0857 143 200 1,900 57,500 3,200 00674 .0236 54,000 000 00/ 200 4.800 (1) ANSLE (L.)
LOADING AREA

LOADING AREA

LOADING AREA 6920. 8050. . ORZS 05/2 .0221 .0531 1540 .0282 90 0 121-C-3 122-C-3 124-C-3 AVERAGE 124-8-3 AVERAGE 9 121-8-3 123-8-3 123-4-3 4VERAGE 121-4-3 とうがし SPE

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TABLE VIII TENSILE TESTS

	CAWELE (R)	466	PROPORT	ouac L	MODU	50:	10 10 10 10 10 10 10 10 10 10 10 10 10 1	101		7657		
14-1 -A-1 A-1	20000						שוניו בי	177	745720	1001		
	(Dec pares)		L'aren	Sconove		Secontar's	7.5	FAILURE RATIO	RATIO	TEMP	CONDITI	2
(27-A-1 (28-A-1 (29-A-1	(200	120	2	31	CSIXIO?	(S/X10%)	(53)			(26)	 	
(28-A-1 (29-A-1 AVERAGE	2	0646	24,500	65,700	4060	3790	65,900	2	61.	R.7		
129-A-1 AVERAGE		.0657	200		3980		65.800	2	.20			<u> </u>
AVERAGE	>	.0674		59,500	3820	3500	29.500	1	61			:
AVERAGE		6570	300	65,600	3680	3610	12,600	1	. 79			
			İ		3885	3640	(3450	7	.215			! +
										-		+
1/6-8-1	15.	.0652	3,700	5.800	1320	1/70	14,900	5	32	 -		+-
121-13-1		.0667	3.900	5,600	1230	0501	12,600	n	200	+-		+
168-13-1	->	.0662	3,500	6,600	1370	1070	13,500	is	27			
124-13-1		0646	3,900	2600	04.61	0011	007 41	V	. 37	-		
AVERAGE					5921	8601	13,900		21.2	-		
							1			-		
126-6-1	0%	.0643	5.900		08/1		11 700	1	100	<u> </u> 		
127-6-1		8070.	000 7	7,000	10101	1230			101	1		
128-6-1	>		2000	25	1000	+			10%	_		-
129-6-1		1	200	4	2000	1730	71	3	100	-		
MITPALL		-+-	3 200	200/3	10/20	1270	100101	0		-		
MEXMES					1488	1350	50,00		.093	! 		-
	.					•					! 	-
7-4-971	0	,0315	14.100	27,600	4000	36.50	21,600	1		300	Salven de	2010
127-4-6		0673	15,600	48,400	0014	3690	004 84	K			3	
7-1-871	-3		14.900	25 500	2000		42 500	1		-	יומע	A TIK
129-4-2		0295 4	300		240		45 300					
AVERAGE					2008	31.70	200 21			1		
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126-8-2	54	,0373	2.300		990		1 400	v			+	+
127-8-2		٠.	800	2.500	†		1 6	, ,				•
128-8-2	->	.0323	000	000	200	+	1,11	7		-		
129-8-2			004	009 0	+-	0000	1000	n v				-
AVERAGE				J		+-	1,00	2				-
		 			1	1	1000			1	-	
126-5-2	90	6680	3.500	5 500	500	270	1 300	ŀ		+	-	-
127-6-2	-	1	7007	200	430	+	500	1		1	-	
128-6-2		7635	3 000	200	100	+	150	1	-		-	
129-6-2	-		3, 6	1000	200	020	1200	1				
AUFPAL	-		000	0000	5.00	410	6000	7				
ANGLE	RETWIFE	100	4.5	200	• • ;	420	5277	:	-			
3	14/11/060	7	127 177 CAC 1		WKEC	とくつくん	40	かららい	Special			<u> </u>

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AND IT (828) RESINS 500 1 10R L 3 なか トブ 171010 XX Z SPECINEN. SOAKED FOR V ZZZ (506) 7-6-57 TEMP 500 К (20) ġ બ ø. LASS TT (4232);

MOBULUS ULTIMATE TYPE

RY PRIMATE TYPE

(PSIXIO) (PSIXIO) (PSI)

ABLURE; FAILURE QK 21 L 1100 0 9 DRECTIONS OF 29600 25,200 2300 29 200 15,900 2350 43800 1750 31,330 2740 37100 2055 38,650 43,900 37,500 38,300 17,000 21,100 50,700 00/6/026 40,400 2530 43,100 05.30 05.30 05.30 05.30 2630 2470 2180 14,000 40,400 36,40 = 13,000 43,800 36,000 17,800 31,300 2430 15,800 32,00 3210 1930 1860 1973 2435 3910 2100 3055 2910 3290 MARROLA C407H-14,800 43,900 3 16,300 39,500 3 16,700 38,300 3 . 0296 7,600 29,600 .0312 10,300 29,200 PROPORTIONAL PRIMARY SECUDARY 200 (PSi) LOAD AND 27,200 25,000 17,000 10,400 120 0348 15,900 41,300 15,800 (ps/ 0337 6348 03/3 .0230 0332 0335 .0322 ,0320 0522 .0304 .0288 (ex!) 1820 BETWEEN TO (1)AWSLE LOADING DEGREES) 0 TYPE RESIN 4232 506 TABULATION SHEET ANGLE **dyerase** AVERAGE 0 4VERAGE 132-4-2 133-4-2 134-4-2 AVERAGE 133-4-1 ーヤーヤケ 7 31-4-2 138-4-1 1-43-84 36-4-1 37-4-1 1-V-14 131-4-32-A-42-4-SPECIMEN

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TABLE X TENSILE TESTS

1 AND II (828) KESIN Page 59 FGT-2156 500 I F CONDITION 7 SOAKED がが 10 to III (50%) WARD DIRECTIONS OF SPECIMENTONS 7657 762P 500 (2/0) ď, FALURE (4232) PIPIPIP 00 00 アタアク ULTIMATE 34,500 008'04 23.90 37.000 20.40 44.200 27.60 50.700 23.95 45.275 34,400 000 44 26,800 33,50 32,650 35,600 49200 यु CLOTH-CLASS PRIMARY SECONDARY PRIMARY SECONDARY

(2-1) (PSI) (PSIXIO) (SIXIO)

4.50 4 2080 2170 2740 3470 2:90 2510 2487 0286 20,400 33,700 2580 0286 16,100 30,700 3100 10287 14,200 27,000 2470 2668 3263 22/0 3200 2783 44,200 26.40 2210 2520 1840 3010 3770 25.20 2210 2580 0293 16,000 32,600 26,800 12,800 49,300 18,100 87,600 AREA INCLUDED TO MOICATE WIDTH 0295 18 600 25,000 11.500 11,100 14,000 026 17 3620. 35,600 0304 9090 10288 4820 AREA (PAI) 0319 0306 .0590 (1) ANGLE DEGREES 0 TYPE RESIM 4232 506 828 9 U Z-4-8H1 149-A-Z AVERAGE 146-4-2 7-4-6-5 4VERAGE 4VERAGE 153-4-1 278805 146-14-1-4-141 148-4-1 149-4-1 152-1-1 158-A-A I 159-4-151-4-12 15/10/ SPECIMEN 156-1

CONVAIR --- FORT WORTH

TABLE I BEARING TESTS

CONVAIR -- FORT WORTH

TABLE XI (CONT.D.) BEARING TESTS

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TABLE XI (COUTD.) BEARING TESTS

SOAKED AT 300PE FOR 100 HRS WHILE STRESSED TO 40% OF ROW TEND, ULTIMATE STR VALUE 32,700 BEAKING 300 SOLKED AT 380°F FOR 34,600
33,400
770 20,90 FOR 30 TEMPS
37,500
ULTIMATE STR. VALUE Page 92 FGT+2186 500 SOAKED AT SOO'L RESIN TEMP, CONDITION (4232) 119-LD STRESS ULTIMATE STR. TIPE T FAILURE 568 27300 568 25300 567 25100 567 25100 37,500 8:0 37 80 7:5 36,20 8:0 38,600 36,350 740 30,000 602 24,300 559 27,000 623 25,900 33,600 27,100
23,200
23,300 27,000 15,150 3 250 (5/32) 72.52 0.50 422 270 631 549 500 582 CLOTH 22,500 22,500 24,100 23,200 24,575 20,000 32,300 00661 084 26,600 17,500 21,200 26,000 17725 26,425 19,000 9050 620 360 205 (587) 495 009 475 390 5/1/2 445 044 019 255 410 463 1092 .0205 .0230 .0214 .0246 1250 0234 .0235 1200 .0225 1210 .0227 .0217 1285 0206 1380 .0259 .1240 .0233 1075 ,0202 . 0229 ,0253 1285 10241 .0233 1160,0218 1155 1255 220 1240 1226 1313 1350 GASE WAVELE DIAMETER 1875 , , , (DEG-REES) タグ 00 0 0 0 100 102-4-5 AVERAGE 05-0-4 102-4-6 103-4-6 2-4-6 102-4-7 AVERAGE 103-6-3 2-101 4VERAGE 7-4-7 101-4-7 103-12-5 2-B-SO 103-8-4 4VERAGE 2-8-20 4VERAGE 5-7-10, 6-8-00 2-8-10 SPECIMEN 101-4-6

CONVAIR -- FORT WORTH

ABLE XII BEARING TESTS

DHMETER (.OO)75") TESTED AT ROOM TENDERATIVES TEMO CONDITIONS RES/8 (506 7657 (5) 25 C/ A. C. D. 1 00 SINAL 1 M W 5011 TELY H 1325 41,500 Teness 1085 52,600 BESRI 1225 47700 STRESS ULTIMATE STR. TIPE 52,800 BEAR. SS ダンリ 005 54 41,900 53300 34,400 5 40,700 5 32,500 1,40,575 40,533 -00 53400 53,800 48,700 42,300 43,600 45,700 44,000 44,075 51,000 5/12 クジウ 250 0500 56/1 1370 550 5.36 34 450 DIR = 77,011 DEFORMED # 50 10/1 110 11.50 (587) (イのアガー 3 KRS. 00/ 2,3,000 33,200 29300 28,000 070 38,100 24,600 35,600 36,000 28,700 01/16 38000 37,766 000 40 200 20,000 17,675 43,600 40,900 38,675 42,600 37,700 40,100 LOF 050 230 MELD 200 750 620 920 000 850 750 1000 925 (1887) 330 1/0 5/6 ģ WATEK .0263 0285 .0278 370.0257 10244 .0263 0206 0214 0206 .0208 1560 ×1116 - 4016 1560 ×1116 - 4016 2610 .0270 .0218 1370.0257 .0261 AREA ,028/ .0211 0241 D157/226 140 0811. 330 005/ 1390 646E 1500 11/25 520 1370 1400 1300 00/ 1040 011110 1980 1100 00 0 BE TWEEN ST. 18 189 UANSLE LOADING DECREES TABULATION SHEET 3 00 9 0 4VERAGE (1) 57RESS 106-4-3 107-4-2 108-4-2 110-4-2 AVERAGE 110 - C-1 AVERAGE 2-8-80 AVERAGE 107-8-3 Ó AVERAGE 16-8-2 10-15-11 2-2-90 7- V-90 107-8-6 AVERAGE 108-5-110-8-1 108-4-1-8-90 1-8-80, 107-6-1-0-501 7 110-4-107-4-SPECIMEN !

TABLE XII (CONTD.) BEARING TESTS

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107-4-3 108-4-3 108-4-3 100-4-3 100-8-3 110-8-3 110-8-3 106-6-3 106-6-4 106-7-4 106-7-4 106-8-4 106-8-4 106-8-4 106-8-4 106-8-4 106-8-4 106-8-4	45 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6		.0219 .0272 .0272 .0272 .0272 .0272 .0272 .0272 .0272 .0272 .0277 .0277 .0277 .0277 .0277 .0277 .0277 .0277		23 23 200 33 23 200 33 25 200 30 200 30 20 20 20 20 20 20 20 20 20 20 20 20 20	2000 000 000 000 000 000 000 000 000 00	43 400 43 400 43 500 43 500 43 500 43 500 600 600 600 600 600 600 600 600 600	BEARING 300	╏╸┄╫╶┞╶┞┈╀┈┦┈╀┈┦┈┦┈┦┈┦┈┦┈┦┈┦┈┦┈┦┈┦┈┩┈┩┈┩┈┦┈┦┈┦┈┦	100 0 X X X X X X X X X X X X X X X X X	300°E, 4KS.
110-8-4 4VERASE 106-C-4 107-C-4 108-C-4 10-C-4 10-C-4	S. 11. 12. 12. 12. 12. 12. 12. 12. 12. 12	1850 C 1870 C 1870 C 1870 C	┞╌╎┈┟┈╎┈╎┈┆ ╶ ╎┈╎	22 028	32 400 32 400 32 400 33 400 33 500	995: 880 1065	45.800 45.800 43.800 45.800 45.800 45.900				Page 94 FGT-2186

TABLE XILL(CONTO) BEARING TESTS

504KED AT 310 F FOR 100 HRS. WHILE STRESSED TO 40% JE ROOM TENP SOAKED AT 303 F FOR E 100 HES WHILE STRESSED TO 20 % OF KOM TEMP Lago 95 FGT-2185 ULTIMATE STO VALUE ULTIMATE STR. VALUE - CCS - CA CZ FOR 1/2 HR STRESS ULTIMATE STRITUGE TEND CONDITION 500 SOAKED 300 (JO) 40,300 BEARING 50,700 75,15,00 31,700 BEARING 985 43,200 35,300 1030 44 300 44,700 31,900 46,800 43,900 43,900 475 35,600 40,300 7555 (2.85.) 25.5. 165 1150 286 298 947 45,700 1165 40,300 905 610 31,800 684 33,600 683 28,200 700 29,400 960 42,100 39,067 703 31,800 600 22,200 650 28,600 560 21,500 1020 39,300 40,300 30,500 34,900 35,300 29,635 30,400 26,025 27,800 945 41,300 (isd) 11510 0501 623 800 650 830 (485.) Ò 225.0230 .0228 1440.0270 .0242 1272 .0239 .0259 0229 .0213 1405.0213 1140 0214 .1396 0262 4550. 291 1360.0255 18 0206 1022 .0192 .0221 1020 .0191 1390,0261 GA66 1383 0621. 1220 1215 0011 1811 . ? . UAN SLE DAMETER LOADING PIN 5/8/ () (DEGREES) TABULATION SHEET 0 90 0 0 106-C-5 40 108-8-5 5-2-011 UVERAGE 4154466 110-2-5 108-4-7 AVERAGE 110-4-6 107-4-7 2-4-80 9-4-80, AVERAGE 7-4-70 106-8-5 5-4-201 MERAGE 07-12-6 107-18-1 107-A-S 106-11-6 SPECIMEN

TABLE XILL REAPINE TECTO

TEST CONDITION	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	A 7													1				(6)	WET (5)]	'ar 'G'	re r-2	90.					
STR. TYPE	(154)	53,100 BEARING	52 100	 	50,600	52,550		0 52,100	1	49.	10	T 1	- ¦	3	58,800	54, 400	42,700	48,700	·	00124	45,600	Z	0617	46275		2 48,100			000/1	47,150		1	43	50,700	7 47 322	W.725 SPECIALEN
YIELD STRESSULTIMATE	(ses)	36,000	29	39,800		34,775		850 32,800 1350	'	32,500 /	005'54	37,035		32, 400 /2	000	170 40,500 1170	4	33,700	, ,	004 80	_]	34,600 9	700 34,000 960	32,975	, ,	32,000 /	33,700 /	37,000	5501 005 95 019	32,375	_ _	52,100	31,900 11	37,500 1130	104	WARP SIRECTION
GAGE AREA	(in) (ind)	1,1295 . d343	5.0254	,0220	160.0236		4	0259	1300 0244	.0255	111/2 ,0209		+	550	.0436		.0233		9 00	0.00138	1500.	+	9000		2000	0333	7 7	30.7	.6033		4560 0501.	2700000000	1003	0000	1000	CAN GROJ
NO. LOADING DIN	(DEGREES) (IN.)	0 .1875		*				2-		*			90)	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	 				<u> </u> -		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			7/2	\ \ \ \					26		- American			ESS AT WILLE
SPECIMEN N	i	Y	1	1 - W-C//	V C	HICKHOC	11/-8-1	١٥	11/2-13-1	1.2-8-1	114-13-1	HICKAGE	11-0-11	112-6-1	13-61	1-5 611	111-0-11	UVEKHOC	(11-4-3		1 2	(-V-N//	t۱٩	200000000000000000000000000000000000000	11/2 8-2	(/2. R-)		114-8-7	AVEDAGE		111-6-3	1/2-6-2	113-6-2	1	10	` !

TABLE XILL (CONTD.) BEARING TEST

Parte 97 FGT-21c AT 300 % 47 300° CONDITION RESIN A SOAKED L SOAKED 7557 2750 P. Cv 300 57.E. 71.PE 7 FAILUEE 7 21,900 BEARING 55475 18700 27600 2440 23875 23,200 24 100 36, 810 36, 810 35, 400 3,400 (8,800 31000 37,000 28,300 30,25 36,300 00718 8 STRESS ULTIMATE 645 23,600 625 630 475 530 435 685 580 630 750 540 (285, 3-41 75% 755 イイのフグ 245 1,600 17,400 15,900 635 25,400 670 31,000 570 35,300 00871 35,800 15,300 18,900 13,100 26,61 25,300 25,600 25,600 19,700 24,300 30,600 (isd) 26,700 21,900 11610 385 550 9 495 670 530 (1887) 249 370 330 475 420 375 590 2/0 500 570 330 582 .0253 .0242 .0233 1346 .0252 C400. C660. 2120. 1204 ,0226 .0333 .0336 .0246 1240.0333 1520. AREA 1480.0241 0350 (2/1/ 8660 SEEO. 1285 .0241 ,0233 TEED. 0161. 0400 1154.0216 1860. 4861. 100 1290 1312 0421 1293 058/ G46E 1149 1218 1356 1243 1/36 5811 1334 1280 1 9/6/1 DIAMETER PIN 18. WANGLE LOADING (0568665) SHEET 45 90 20 0 TABULATION VERAGE 4, 11-18-3 113-13-3 4VERAGE 13-8-4 113-6-4 4VERACE WERAGE 4VERAGE 1-4-H 14-8-4 113-6-3 13-4-4 4-8-21 12-6-3 11-13-11 4-2-61 w AVERAGE 11-6-3 11-11-11 4-2-11 112-4-3 14-A-3 113-4-3 ١ 111-14 SPECIMEN

TABLE XIII (CONTD.) BEARING TESTS

STRESSED TO END OF WHILE ROOM TEMPO CUTINATE STR. VALUE 300 500 MR. WHILE TO V STRESSED TO 25% OF STRE STRE JATIMATE 5005 Page 98 FGT-2186 K FAILURE TEMP. CONDITION A SOAKED FOR 8 300 BEARING MRS. 450 20,900 BEARING BEARING 7/76 ; LARS. HES HRS. 1 1 1 1 22,850 STRESS BERNAMM ULTIMATE STR. 647 28,000 17,700 SS#77 00 6,300 6,350 300 0017 2500 9500 6,000 5 1 100 00, 2100 5,000 1,600 SOAKED SOAKED SOAKED FALURE (285) STAKED 1 550 200 05/ 125 アグ 500 00 132 11.40 NOO 440 į 440 0900. 1 0048 4000 1500 チェクソン 1 0032 0056 2000 SPECIMEN SPECIMENT 20,850 SPECIMEN 004 41 27,300 SPECIMEN 5,950 20,000 5,933 5,600 5,000 3 ; 6.800 (782) VIELD 345 632 BEFORE 430 160 133 130 BEHORE BEFORE BEFORE 143 50 1330,0331 AREA 1 .0215 1280 .0240 1 Civil 1253 .0235 0230 1/50.03/6 1250 0234 1208 .027 6500 1202 .0225 1260.0236 02/8 1340.0251 1140 0214 .0231 EAILED CA1160 FAILED FAILED 646E 1147 . . 1225 1232 0/2 1 WANGLE DIAMETER 1/875 1 DE GREES) 0> 15 0 0 00 0 4 112-A-6 114-A-5 AVERAGE 114-8-5 W-A-5 12-A-S 13-4-5 4VERA66 11-4-6 112-4-8 4VERAGE 4-4-6 113-6-5 13-4-6 12-8-5 4VERAGE 11-8-5 12-4-7 14-4-7 14-6-5 13-4-7 12-4-5-5-11 11-4-Specimen

CONVAIR --- FORT WORTH

TABLE XIT BEARING TECTS

SHEET
Z O
ATI
ב
TAB

_	KLIK KESIN	IR CONDITION		Jan	•										! !! !! !! !!							10 1000	SOFKED 41	100 ACS										Pa PG	90-	2	22	5	rek (.0075")
•	1/2/2/ 	STR. FAILURE TEMP	20	-1	1	32 300		12		O SUEAD	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	100	3 BFARING			J TENSION		A				O READING 200		-	27,200	 		544.42			13548/116	·		TENSION		12			WAL DIAMETER
,	~ II	ULTIMATE SI	(PS) (PS)	l	1	١,		500	IJ			22 920	†·	3		5 25,700		3	4 21 500	1,5		ı	5 2760	26 80	2 27.200			13		1.8	_	3	-	15,500	29	17,300	19		SPECIMEN 175 ORIGINAL
Į,		- 31	(111)	707	607	8	125	 		577	35	7.87	555		-	555	42	584	244	 	 	590	57.	650	592			7/7		53	536			-+	0070 350	365	413		10 1
ガトワノン	STRESS DEFORMATION	2	(PSi)	27,300	29.100	26.600	23,500	26,625		21,300	23,400	25,800	23,000	13,375		20,800	00/6/	21,300	22,400	20,875		20,100	25,200	23,700	21,000	25,500		19800	(Z 932	25,200	17,200	18,550		2	-1	,600	12,500	4,550	DEFORMED 4%
143	11610		4		_	529	_			084	512	585	480		\dashv	-	- 1	470	460				525	575				435		-+	360 /			+	- 1	350 1/2	- 1	- 1	S S S S S S S S S S S S S S S S S S S
	E 40E A	,		•	-		5.0217		7		\rightarrow	+	.0209				100/18		20200.		. i			. •	.0218			0000	- +	+	1,000%		1233	2000	8:00	1001	100116	deid	HOLE
	DIAMETER GALE	, N/d	(1/1)	-	0///:	./355	.//55			1200	2/1/2	./2/2	5///2			- 1/150	1,60	1/85	1107:			.1247	0///	3627.	.//65	-		1//3		7/3//	- 1///3		1501	//37	10// 1		/2//:	4040	SEARING
SHEET	(1) AWELE	(DECORE)	(Canada)	9-	+	>			1/1/	2	-	>		+	20) -		\ \ \	- -		(0	+;	 	-	+	1	43		+			8			-		W.	SS AT WHICH
SHEET SHEET	SPECIMEN NO		1-1-1//		ξ],	77	111-H-111	HVCKHOE	116 8-1	1-0.0//	1-9/11	1-0-011	111-0-1	25 H V 3 N D	116-5-1	17-6-1	11811	1-5-6//	1111 0400	7754 SO	C V ///	1/	2-4-111	010	ИЯ	ALLANS	0-8-111	0 2 2		18-8-11	475047	1013177	2-2-9//	117-6-2	112-6-2	119-6-2	AVERAGE	DANGLE B	(Z) STRE

TABLE XIL (CONTA) BEARING TESTS

30 465 AT 300 15 FOR 100 A 400 W. 165550 D A 400 W. 1655 M. 16 STRESSED Rosm TEME Page 100 FGT-2186 AT 300 % AT 500 E CONDITION ULTIMATE STR \$7/H/N TO 20% SE (4232) Q Z 100 MRS. SOAKED SOAKED 1 76.57 76.00 300 500 18,800 BEARING 12,800 SHE ". R FA1LURE **SSP7**フ 14,100 TENSICH 13,900 BEARING 14,735 27,200 BEARING 16,400 BEARING 14,500 TENSION 18,200 SHEAR STRESS ULTIMATE STR. TYPE 0055 7E 24, 600 23, 500 16, 200 21,975 22,700 23,600 21,000 28,400 50181 イノのフン 335 (4.08s.) 543 663 330 575 540 513 349 OHA 353 759 6/0 11/1 25.5 26,500 550 24,000 24,200 13,700 13,600 13,700 13,735 25,400 26,066 006 17 25,600 27,300 00/1/1 21,600 13,600 16,000 19,100 19,700 13,000 (12d) 11510 (LBS.) 503 560 450 530 620 295 64.3 130 400 300 270 337 310 335 340 3/5 6460. .0229 6480 .0206 0000 .0245 1203 10226 .0209 8000 0220. 22/1 8450,0551. 1080. 8660. .0238 3 1.001 8000. ,0238 .0213 070 1290 020 GAGE 0851 100 1368 11/10 6/2 1304 アダン 12: 774 6011 1875 WANGLE DIAMETER 5 (DECRESS) 8 クク O. 0 1VERAGE 116-13-3 117-18-3 112-18-3 10 VERAGE AVERAGE 4154066 19-13-3 AVERAGE 117-4-3 119-4-3 2-8-81 S-4-8 4-4 5-4-91 17-4-5 16-0-3 8-4-8 19-6-3 16-4-4 18-0-31 7-6-3 SPECIMEN 1

TABLE BEARING TESTS

-	(506) RESIN	0ND1710N																				1000	SAL 100 HRS						Pa	ge T-2	21	01 86					HOLE WAS DEFORMED	•
	17. 17. 17. 17. 17. 17. 17. 17. 17. 17.	י איני	1 (Psi)	7	307 29 400	534 28700	ĺ		507 27.900 SUEAR	26,000	476 24,700 V	478 25,000	27,400				368 20,700 V		26,350		28,600 BEARING 300	25,400	27,200 1	520 30,400	22,900		433 24,100 SHEAR	7	20	12		300 15,900 TENSION	6/		259 13,900	16,150	COSS SECULOS SECULOS NO SECULOS SECUENTAS SECULOS SECULOS SECUENTAS SECULOS SECUENTAS SECULOS SECUENTAS SECULOS SECUENTAS SECULOS SECUENTAS SECULOS SECUENTAS SECUENTAS SECULOS SECUENTAS SECULOS SECUENTAS	
	GAKE APEN DEFORMATION	I'M FAILURE	S 0360.	.0920.0173	1	9810.		Circ	710.0182	710.0171 .0056	01/18 .0056	. 0006		0990 0186 .0020	1070	7400. 0710. 036	030 : 0193	2600 : 5110.		9	10166 .003K	7900' 1110	10184 0056	4900 . 1/10:		1976 0193 000	17/01/1/10/1	. 0179 .0062	ļ		0000	10184 ,0038	4	0,000 1000	5700. 9810.	LOAD AND WARD DIEG	ORIGINAL DIAMETER.	•
	SPECIMEN NO. WALLEDAMETER		0	182-4-1	1211 4	AVEDACE		121-8-1 UC	+	123-8-1	124-8-1	AVERAGE		16-5-1	1/5/-/-/	123-C-/	1/54-6-1	AVERAGE		121-4-2 0	122-4-2	123-4-2	124-4-2	AVERAGE		141-13-6 45	_	12.0-6.7	AVERAGE		121-6-2 90		123-5-2	124-C-2	AVERAGE	1) ANSLE BETWEEN	0 17	

7ESTS BEARING (conto.) TABLE (2) XV CONVAIR --- FORT WORTH

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Page 102 FGT-2186 100 KES/X 500 47 CONDITION (506) SOAKED Z 1 TEST TEMP 500 (30) CLASS (1) (751) 21,500 BEARING 21,400 22,500 32,500 32,500 FAILURE TENSION SHEAR 00161 ULTIMATE STR. 15,600 19,150 19,600 14,700 CLOTA 389 356 428 405 25.3 3/8 357 DEFORMATION FAILURE 4400 8400. 8900 0058 8900. 143 .0066 .0056 1,0040 ,0056 0000 8900. 2044 1880.0184 .0166 ,0162 5810. E910. 5980. 8810 0180 1810. .0183 1810: .0182 AREA 1610. 8101 2960 .1003 0962 2980 0770 GASE 2860 1880 8660. U)ANGLE DIAMETER LOADING PIN (DEGREES) (IN.) 1875 TABULATION SHEET 90 0 121-8-3 122-8-3 123-8-3 124-8-3 AVERAGE 121-4-3 122-4-3 123-4-3 124-4-3 4VERAGE 127-C-3 122-C-3 123-C-3 124-C-3 10 4V5R46E SPECIMEN

BEARING TESTS 748LE XVI CONVAIR—FORT WORTH
TABULATION SHEET

(285) (PSI) (6F)	36,800 BEA	35,300 4	500 V		45.48				-	+		\	_	4-4	`	407													ĹĹ
(PS,)	\vdash	35,300 \	500 VENSION		45.48			+		ļ					2005		 									-			
1	\vdash	35,300	200		1/2		+			TENSIN		35/11/9				-	TE11510N	 >		SHEAK		,	BEARING		TENSON	>-	PEARING	>	2
(582)	5		3/0	29735	37.500	32,100	35,300	39 500	36,100	25500	82700	34,500	41,400	3/155	22,430	21.900	001 #	00571	5000	17,900	18,100	19,100	500	006'6	13,800	 -	21,400	72,300	L
	795	040	7	7-1	046	+	855	865	-1-	590	1	j l			500	+	350	340		425	\leftarrow	57%	_		325	 		400	
(M)	.0043	0000	0048							.0068	0056					! —							1						2,375
(150)		30,200	 '		25,900	31,900	31,000	34,000	30,700			31,900	34,200		17.300	15,000	11,300	00,00	13,700	000 //	16,930	16,400	2,000	7,335	10,200	005/11	04/71	11,200	12,375
(587)		725			650	1		_				800	255		385	350	295	235		260		- 1	ı		240	270	4115	,	(6)
(/M/)	0216	0240	0219		0251	0246	2470	0219		0231	0233	1520	0221		0223	0233	8420	0221		0237	8420	0244	0236				1520	0231	4411
(111)					1340.				-											 • 	╌┼				1253	1270.	- 31	- 1	1000
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	0-	+-			45		*	-		90					0		>			45		+	_		2		-	+	RES
	/-/			AGE	8-1	13-1	7-2	7-7	10 €	(-)	1-3	1-0		466	4-2	-4-2	2-12	ア・ア・	39FC	8-2	-8.2	7-8-7	7-8-	KASE	2-5	?'\	-6-2	~	826 CC:
	166-4	128-12	129-4	AVER	126-1	127-	1600	1-42/	4VEK4	126- 0	127-6	128-	127	AVER	126-	127	128	169.	AVEA	126-	127	166	16.9.	HVE,	126.	127-	120	1/2/0	AVEX
	(DESPESS) (M) (M) (LBS) (DS) (M)	4-1 (DESREES) (M) (M) (LBS) (DSI) (M) (M)	4-1 (DESRES) (M) (M) (LBS) (DS) (M) (M) (M) (LBS) (DS) (M) (M) (M) (M) (M) (M) (M) (M) (M) (M	4-1 (DEGREES) (M) (M) (W2) (LBS) (DS) (M) (M) (M) (M) (M) (M) (DS) (DS) (DS) (DS) (DS) (DS) (DS) (DS	4-1 (DESRES) (M) (M) (W2) (LBS) (DS) (M) (M) (M) (M) (M) (M) (DS) (DS) (DS) (DS) (DS) (DS) (DS) (DS	4-1 (DEGRES) (M) (M) (W) (LBS) (DS) (M) (M) (M) (M) (M) (M) (M) (M) (M) (M	4-1 (260,8765) (M) (M) (M3) (2.85) (25) (M) (M) (M) (M) (M) (2.85) (25) (25) (26) (26) (26) (26) (26) (26) (26) (26	4-1 (260,8655) (141) (141) (145) (251) (14	4-1	4-1	4-1	4-1 026,865 (iii) (iii) (iii ²) (LBS) (DS) (III	4-1	4-1	4-1	4-1	4-1 060,8615) (141) (142) (265) (265) (141) 4-1 0 1,875 1,150 0216 1,007 0.043 4-1 0 1,875 1,150 0.0234 1,007 0.043 4-1 1,170 0.029 6.50 25.90 0.048 6-1 45 1,170 0.0246 7.85 31,000 6-1 45 1,170 0.0246 7.85 31,000 6-1 45 1,170 0.0246 7.85 31,000 7-5-1 45 1,170 0.021 7.85 31,000 8-1 45 1,180 0.0231 7.85 31,000 8-1 45 1,180 0.0231 7.55 34,200 8-1 46.6 1,189 0.0221 7.55 34,200 8-2 1,189 0.0223 385 17,300 8-3 1,189 0.023 35.00 17,300	4-1 0.1875.1150.0216.0240.0243.0243.0243.02443.02443.02443.0246.02246.0243.02443.0274.0274.0274.0274.0274.0274.0274.0274	4-1 0 0.89 (M) (M) (M2) (DS) (DS) (M) (M) (M2) (DS) (DS) (DS) (DS) (DS) (DS) (DS) (DS	4-1 0 66665 (M) (M) (M2) (285) (757) (M) (M2) (485) (757) (M) (M) (M2) (285) (757) (M) (M2) (285) (757) (M) (M2) (285) (757) (M2) (758) (757) (M2) (758) (757) (M2) (758) (758) (758) (M2) (758) (758) (M2) (M2) (M2) (M2) (M2) (M2) (M2) (M2	4-1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4-1 0-6.8815 (M) (M) (LBS) (751) (M) (M) (M2 (185) (751) (M) (M) (M2 (185) (751) (M) (M) (M2 (185) (751) (M) (M) (M2 (185) (751) (M) (M) (M2 (185) (751) (M) (M2 (185) (751) (M) (M2 (185) (751) (M) (M2 (185) (751) (M) (M2 (185) (751) (M) (M2 (185) (751) (M) (M2 (185) (751) (M) (M2 (185) (751) (M) (M2 (185) (M2 (185) (M) (M) (M2 (185) (M) (M) (M2 (185) (M) (M) (M) (M) (M2 (185) (M) (M) (M) (M) (M) (M) (M2 (185) (M) (M) (M) (M) (M) (M) (M) (M) (M) (M	4-1 0 (185)	4-1 0-1875 (M) (M) (M) (D) (M) (M) (M) (M) (M) (M) (M) (M) (M) (M	4-1	4-1	4-1	4-1	4-1 (185) (14) (14) (14) (185) (185) (185) (14) (14) (14) (14) (14) (14) (14) (14

TABLE XVII BEARING TESTS

	7 H - (1 255 TT (432) TT (506) 200 TT (879) PESING	STRESS ULTIMAT	(PSI) (LRG) (PSI) (10E)	25,100 747 30,000 754,5000	30 300 361 39 500	21 400 /47	27 900 902 70 600	7/70 100 30,000	34/23	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	11,400 561 K3,230 BEARING 500 SOAKED A	14 900 403 18,200 1 FOR 1/2 +	19,100 580 27,000 1	19,900 633		 50 34,000 981 44,500 BEARING R.T	35,800 892 41,400 TENSIM	29,200 929 43 100	35,400 922 43,500	T		70 21/00 095 112 100 CEARING 0 T	25 UNO 010 3/ 100 DEAKING K.	28500	31,800 990 49400 7545100	F	ag GT	3e	1.0	Q4 Θυ 1		
(DECAREES)	120 020	FR SAGE AREA YIELD	(in.) (IN) (LBS.)	5.1300.0244 612	1,0219 664	.0234 500	1240 1733 150			757	120	066/ 350	.0215			.022/ 750	.0216 772	.0216 630	.0212 750				.0237 150	,0256 730	.0200 135							
666 HE S SER 1 - 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		(1) AWELE	(DEGREES)	0								+++++++++++++++++++++++++++++++++++++++				206		*				828										

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TABLE XVIII BEARING TESTS

II (828) AND IV (828) RESINS AT 500 % Page 105 FGT_T2,156 ける OLAN'E TEK (0075") CONDITION SOAKED FOR DR15/ NAL TEMO イダ 500 (70) ġ ين 34200 BEARING FAILURE (4232) 50,900 BEARING 49800 BEARINS SHEAR 175 MELD, STRESS ULTIMATE STR 1030 46,600 35,400 32,400 32,900 33,22,5 050,00 20,700 19,100 027 45201 027 086 0274 086 40,900 40,400 SPECIMENT 496 OF 20,500 PSI H 55070 795 1/30 (1887) 5801 756 444 044 2/2 167 27,700 27,900 395 18500 39400 36,900 37,000 17,700 5687E 420 17,500 DEFORMED 37,600 (1521) 2172 6 CLOTH 37,000 DIRECTIONS WAS DEFOX 245 710 075 395 830 395 820 8000 1135 .0240 8 AREA (ING) .0233 .0223 .0225 .0230 .0223 0222 0219 .0221 .0218 6120 .0212 .0224 MARP 1185 0421. 0871 GAGE 1200 1190 1225 0611. 1159 1100 130 194 1 170 BETWEEN LOAD AND AT WHICH BEARING (1) ANSLE DIAMETER 1.1 LOADING (DEGREES) RESIN 4232 506 828 (1) ANGLE ? 40. 4VERAGE 4VERAGE AVERAGE AVERAGE 154-4-1 15-8-11-1 147-4-2 7-4-74 48-A-2 7-4-64 59-4-1 51-4-152-4-1 57-12-1-17-95 48-A-149-4-SPECIMEN 47-A--4-77

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